October 1956

# finish

THE MAGAZINE OF

*Appliance* AND

Metal Products MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT

# NEW -and News-making!

# The PATTERSON futura BALL AND PEBBLE MILL

**FEATURING**

- Accurate Temperature Control
- 20% Greater Jacket Area
- Corrosion Control in Water Jacket
- Motor Drive Integral with Mill Stand
- New Type Outlet Valve
- Optional Bearing Design

. . . breaks all records for grinding efficiency, affords operating safety and convenience heretofore unknown. Rigidity, alignment and precision machining are unsurpassed. Truly the Futura is the result of advanced engineering design. This is a mill that will operate profitably, stand up to the daily grind for years with the lowest of low maintenance, and will return its investment cost time and again. We invite you to write today for complete details of the FUTURA Mill.

**The Patterson Foundry and Machine Company**
**East Liverpool, Ohio, U. S. A.**

NEW YORK, BOSTON, BALTIMORE, PHILADELPHIA, PITTSBURGH, DETROIT, CINCINNATI, ATLANTA, CHICAGO, ST. LOUIS, HOUSTON, DENVER, LOS ANGELES, SAN FRANCISCO, SEATTLE

**The Patterson Foundry and Machine Company, (Canada) Limited**
**Toronto, Canada**
MONTREAL

# Every surface is a work surface when it's Porcelain Enameled

Every porcelain enameled surface in the kitchen . . . drain boards, range tops, dishwasher tops, cabinet tops, and many others . . . provides a work area. That's one important reason why busy housewives prefer appliances with this beautiful lifetime finish.

Porcelain enameled finishes make good work surfaces because this dense, glass-like material resists food acids, scratching, heat, and thermal shock. Ordinary soap or household cleaners keep porcelain enamel clean, sanitary, and free of stains.

What's more, porcelain enamel won't fade, stays color-fast. An infinite variety of colors and shades is now available.

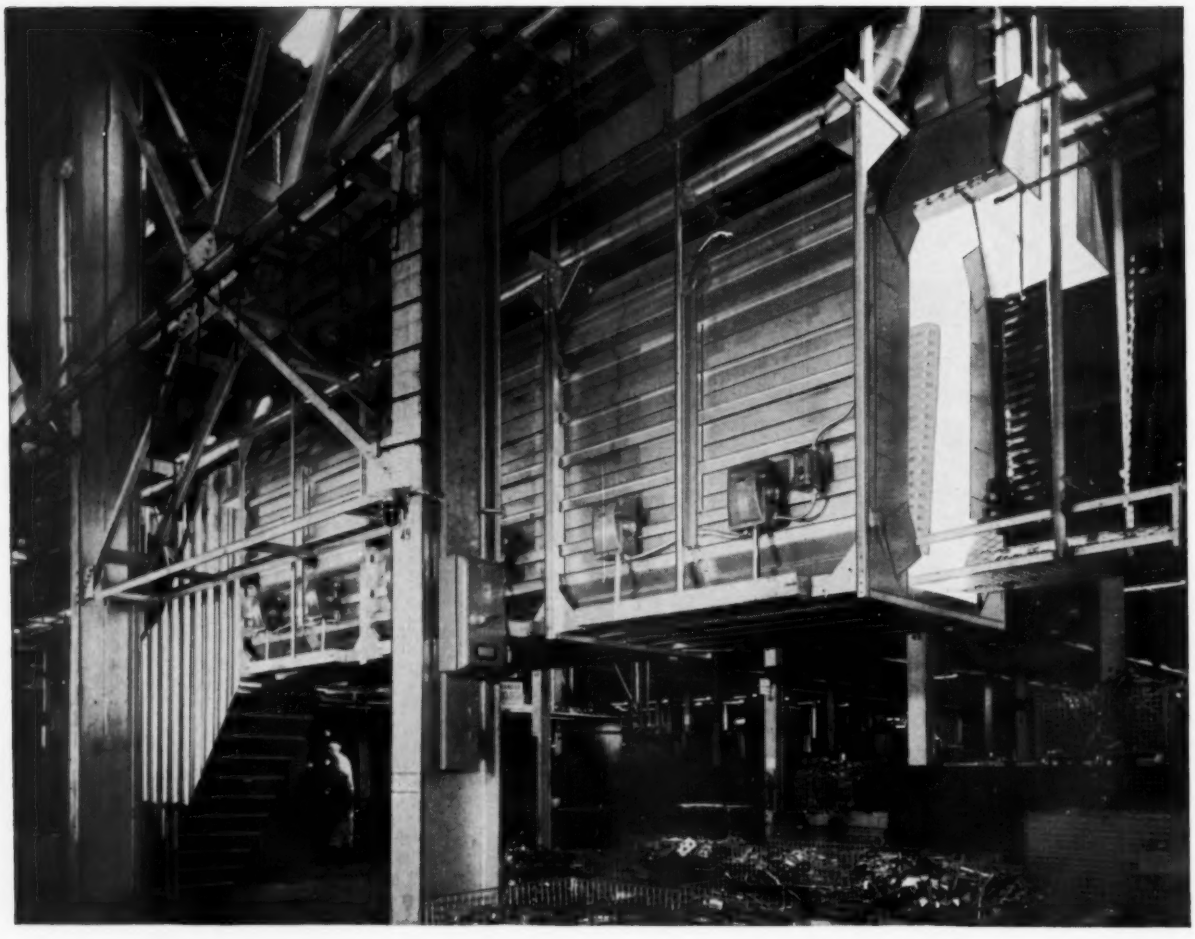
**QUALITY BASE METAL**

For more than 40 years, porcelain enamelers have been specifying Armco Enameling Iron for the base metal because of its uniform flatness and bonding characteristics. During that time it has become known as the "World's Standard Enameling Iron."

If you would like to consider giving *your* products all the sales advantages that go with a porcelain enamel finish, let us send you our catalog, "*Armco* Enameling Iron." This informative booklet contains helpful tips on fabricating, welding, cleaning, pickling, and porcelain enameling. Just fill in and mail the attached coupon for a free copy.

**ARMCO STEEL CORPORATION**
2346 Curtis Street, Middletown, Ohio
Send us your catalog, "Armco Enameling Iron"
We manufacture_____
Name_____
Company_____
Street_____
City_____ Zone____ State_____

**ARMCO STEEL CORPORATION**
2346 CURTIS STREET, MIDDLETOWN, OHIO
Sheffield Steel Division • Armco Drainage & Metal Products, Inc. • The Armco International Corporation

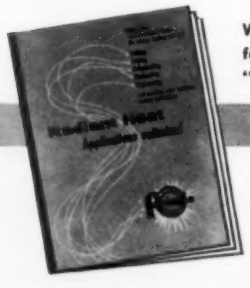


Fostoria Radiant Oven at Westinghouse, Columbus, Ohio

## PROCESSES 24,000 PARTS EVERY WEEK

It takes only 15 minutes to dry refrigerator back-plate condensers for stacking—at the Columbus, Ohio Westinghouse plant, a recent addition to the company's Electric Appliance Division.

Using a fast-drying Fostoria Radiant Oven, this modern plant is able to process 10,000 to 12,000 condensers for major appliances, plus the same number of miscellaneous small parts, every 5-day week. In thousands of similar industrial applications, Fostoria Radiant Ovens speed up production, save valuable man-power . . . and cut operating costs as much as 50%. Fostoria design permits overhead installation to save work space (as shown above) and allows easy relocation, if necessary. Want to know how an efficient Fostoria Radiant Oven can save money and improve product quality *for you?* Send for complete details today!



Write for free, fact-filled booklet— "Applications Unlimited"

INFRA-RED fostoria SYSTEM

5511

**FOSTORIA PRESSED STEEL CORPORATION** • Dept. 1020, Fostoria, Ohio
Pioneer manufacturer of radiant equipment—from components to complete ovens

# Aluminum is Texture

Aluminum can be the smoothest of mirrors, or a floor so coarse that no one will slip on it. It can brightly reflect 90% of a surgeon's light or smother a sunbeam on a sniper's rifle. Between the extremes of finishes that are infinite with aluminum, lies a world of textures for exciting design. Aluminum may be tumbled, burnished, sandblasted, scratch-brushed, hammered, buffed, etched, electro-brightened, embossed, coined, stamped, or textured by many other different ways. Alcoa's Process Development Laboratories have seldom seen a texture that aluminum will not take. It is equally true that most of the basic textures for aluminum have been pioneered or developed by Alcoa. Add texture to the list of reasons why aluminum is the designer's metal, and Alcoa your source of idea exchange.

*Look forward with* ALCOA

## HERE'S A SOLID FOUNDATION FOR IMAGINATIVE DESIGN IN ALUMINUM

In Alcoa's library are many publications prepared with but one objective: to help designers and fabricators learn the basic facts about aluminum. How to design with it. How to work it. How to join and fasten it. How to capitalize on its unique advantages to get better, longer lasting, lower cost products.

Among the newest are these . . .

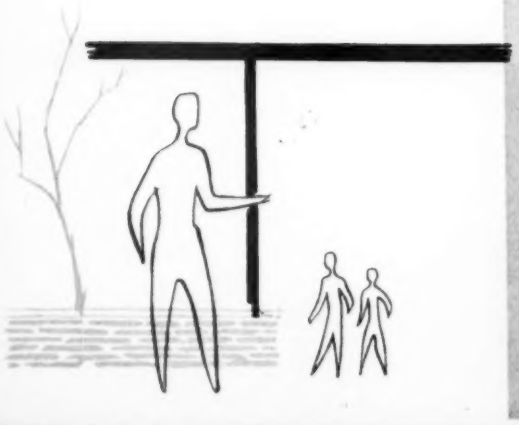
**Finishes for Alcoa® Aluminum**—a colorful, penetrating handbook prepared by the men who know the most about aluminum finishes. It includes all of the latest and most exciting finishes and tells how to achieve them.

**A New Horizon in Extruded Shape Design**—a thorough text designed to stimulate imaginative thinking about designing and applying extruded aluminum shapes.

**Metal in Motion . . . Alcoa Impacts**—the very latest facts on this fascinating way to produce complex shapes in aluminum with a single press stroke.

In addition to these newest Alcoa publications, the Alcoa library has hundreds of others, plus dozens of motion pictures. Most of these are described in a 41-page index called *Alcoa Informational Aids*. All of these films and publications are available from Alcoa for your use.

Order this index and these newest publications right now. Send your name, address and company affiliation to ALUMINUM COMPANY OF AMERICA, 2182 Alcoa Building, Pittsburgh 19, Pennsylvania.



October • 1956
VOL. 13 • NO. 10

## FEATURES

Page

FORMABILITY OF METALS—PART ONE ..... 23
by Lester F. Spencer, Consultant in Metallurgy

PRINTED CIRCUITRY IN MAJOR APPLIANCES ..... 28
by C. F. Kent, Sales Manager, Printed Circuit, Cromane, Inc.

HOW ADAMS RITE FINISHES SMALL PARTS ..... 36
by Gilbert C. Close, Western Editor for *finish*

LOW TEMPERATURE PORCELAIN ENAMELING AT CONNERSVILLE, INDIANA ..... 40
by Frank H. Thomas, Vice President Porcelain Steel Corp.

A REALISTIC LOOK AT APPLIANCE SERVICE ..... 49
by S. R. Payne, General Service Manager, The Maytag Co.

SIMPLE ENGINEERING GREATLY IMPROVES PAINT STORAGE SYSTEM ..... 55

WESTINGHOUSE's NEW PLASTIC REFRIGERATOR ..... 61

WHAT YOU SHOULD EXPECT FROM YOUR PAINT TESTING LABORATORY ..... 63
by Francis Scofield, Nat'l. Paint, Varnish, and Lacquer Assn.

ROLLOVER VACUUM LIFTER ROTATES SHEET 180° ..... 74

ARMCO's FIRST TRAVELING SALESMAN ..... 84
*finish* salute to W. W. Sebald's 50 years of service

SAFE TRANSIT SECTION ..... 85
INDUSTRY PACKAGING EXPOSITION AT ST. LOUIS....ST-2
ASSURING SAFE TRANSIT AT VERNON STOVE.....ST-5
SAFE ARRIVAL IS IMPORTANT TO REVERE ELECTRIC...ST-8

## DEPARTMENTS

FINISH SPOTLIGHT—Toastmaster's hot-food-server..... 9
INDUSTRY MEETINGS CALENDAR ..... 10
LETTERS TO THE EDITOR ..... 17
INDUSTRY NEWS AND PERSONALS ..... 64
NEW SUPPLIES AND LITERATURE ..... 72
SUPPLIER NEWS AND PERSONALS ..... 78
ADVERTISERS INDEX ..... 96
CLASSIFIED ADVERTISING ..... 96

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A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. The editorial scope covers design, engineering, market and statistical information and technical and practical information on plant facilities and all phases of manufacturing "from raw metal to finished product." Free controlled circulation to top management, purchasing, engineering and key plant management and supervision in metal product manufacturing plants. To others, subscription price is $5.00 per year, domestic. To all other countries $8.00 per year (U.S. funds).

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METAL PRODUCTS MANUFACTURING
FROM RAW METAL TO FINISHED PRODUCT

LORD HALL LIBRARY

# *Youngstown Sheets and Strip are Quality Controlled to help Control your Product's Quality*

*Photo courtesy Hydraulic Press Mfg. Co.*

When you specify Youngstown Cold Rolled Sheets and Strip you get a product of uniform high quality. Tested and inspected at every step in Youngstown's fully-integrated operations, they are held to rigid high standards of ductility, tensile strength, flatness and surface finish — which guarantees you an almost continuous production of even the most difficult-to-form parts. This makes for increased profits, greater production, lowered costs and an improvement in over-all product quality.

For additional information or metallurgical assistance, call or write your nearest Youngstown District Sales Office—or write direct to our Home Office.

QUALITY YOUNGSTOWN SERVICE

**COLD ROLLED SHEETS AND STRIP**

**Youngstown**

**THE YOUNGSTOWN SHEET AND TUBE COMPANY** *Manufacturers of Carbon, Alloy and Yoloy Steel*

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**SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS**

## STEELCASE INC

### adds to individuality of new CustomLine with increased variety of custom colors*

Introduced for the first time this month, the new Steelcase CustomLine offers greater individuality by providing for a wide choice of interchangeable styling features like hardware and legs. New colors add to the variety of styling combinations now available and provide further opportunities for individuality. These colors were created in our studio to enhance the already popular Sunshine Styling colors in the Steelcase line, and their immediate success in several leading administration buildings indicates again that the right finish increases acceptance and saleability.

*Write for help on special problems*

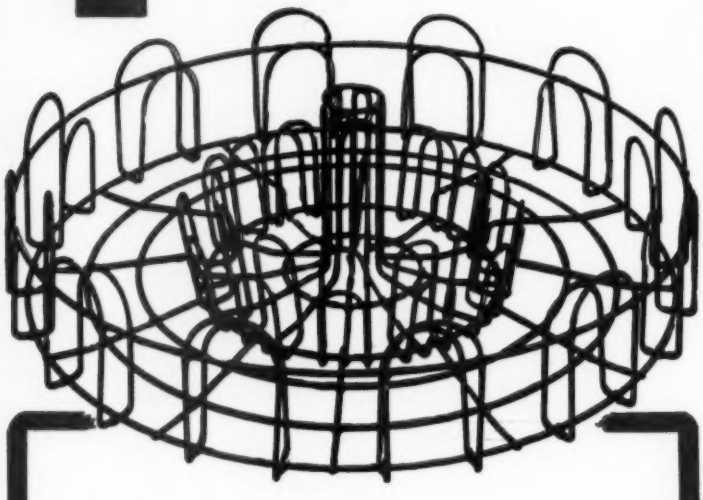
## GRAND RAPIDS VARNISH CORPORATION

**Grand Rapids, Michigan**

*Makers of the famous* ®Guardsman *Finish and* ®Guardsman *Cleaning Polish*

***THE BETTER THE FINISH THE BETTER THE BUY**

# WHAT COMPRISES A QUALITY PRODUCT?



Poly-vinyl coated dish-washer rack fabricated for one of America's outstanding manufacturers of major appliances.

A quality product is comprised of many attributable factors. Raw materials, well selected, provide the basic ingredients. But, raw materials must be combined with other qualities to insure the best. Here is where craftsmanship and engineering skill develop raw materials to their ultimate in quality. In this stage true quality of a product is born.

Craftsmanship and engineering skill have been basic since Peerless' founding in 1910. Peerless rests its reputation on the quality of its products. . . . This is the reason for the demand of Peerless products by the great names in American industry.

If your needs call for wire formed products, Peerless can do it better, faster at less cost. Send us your prints for quotations by return mail.

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LAFAYETTE, INDIANA

# VAN SEAL

## FRAMES for BUILT-IN SINKS and RANGES

PATENT NOS. 2,440,741, 2,704 370

**Made by specialists in the designing and manufacture of clamp-down frames**

**YOU CAN DEPEND ON THESE FEATURES**

Vance has pioneered in the manufacture of stainless steel clamp-down frames and has already produced more than a million!

When you use VanSeal Frames on your built-in sinks and ranges, you can be sure of a frame that will fit perfectly! Installations can be made with confidence.

VanSeal Frames assure easy, sanitary, self-aligning installation and added beauty for your counter-top and built-in range units. Benefit from Vance Industries' long experience in making frames for all types of built-in units.

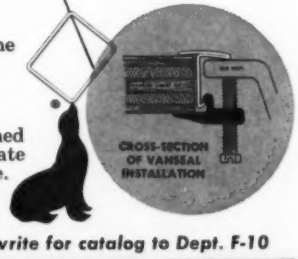
...Specify VanSeal and be sure!

**PERFECT BENDS—EVERY TIME**
Each corner radius is exact, assuring a tailor-made fit.

**LEGS ARE ALWAYS VERTICAL—STRAIGHT**
The vertical leg of every VanSeal Frame is at a perfect 90° angle to the top flange to assure a tightly-sealed installation.

**EXACT UNIFORMITY**
VanSeal Frames of the same size are consistently alike in their measurements.

**INVISIBLE WELDS**
Welded so perfectly—finished so smoothly—you can't locate the weld on the top surface.




*Call your VanSeal Distributor or write for catalog to Dept. F-10

**VANCE INDUSTRIES, INC.**
2108 Jackson Avenue • Evanston, Illinois

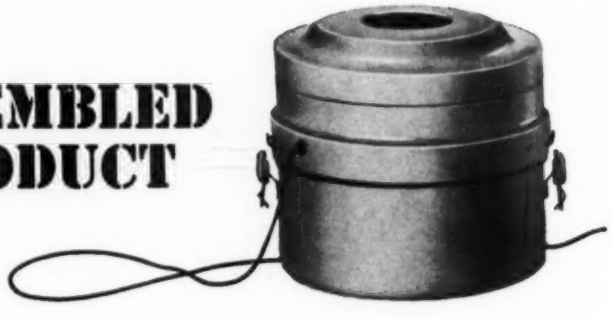
Orders Shipped Same Day Received

# THE finish spotlight

Meals can be kept hot and tasty for hours in Toastmaster's Hot-Food-Server. The stainless steel electric warming unit features moisture controlled drawers, and a hot air circulation system surrounding the two drawer areas assures uniform heat. The unit can be built in flush with kitchen base cabinets.

. . . or anything in-between . . .

ASSEMBLED PRODUCT



Follansbee's Sheet Metal Specialty Division is now equipped to produce from raw stamping to completely fabricated, finished, assembled and packaged product—even though the stamped metals are only a minor part of the completed job!

No matter what your requirements are or how intricate your specifications, Follansbee engineers will work with you in designing or redesigning your component parts. Complete tool room and die making facilities are available as well as one of the most modern finishing and assembling lines in the industry.

**Call Follansbee engineers in early to discuss your stamping problems. A cost analysis on your job will be submitted without obligation.**

SHEET METAL SPECIALTY DIVISION

FOLLANSBEE

STEEL CORPORATION

BOX 567 • FOLLANSBEE, WEST VIRGINIA

# MEETINGS

### ELECTRICAL ENGINEERS MEET

American Institute of Electrical Engineers, fall General Meeting, Morrison hotel, Chicago, Illinois, October 1-5.

### ASTM COMMITTEE C-22 MEETING

The ASTM Committee, C-22, on porcelain enamel, meeting at Battelle Memorial Institute, Columbus, Ohio, October 2-3.

### NATIONAL METAL CONGRESS

The National Metal Congress and Exhibition, Cleveland, Ohio, Exhibition Hall, October 8-12.

### METAL CURTAIN WALL WORKSHOP

The Metal Curtain Wall Workshop Conference, Building Research Institute, Washington, D. C., October 15-16.

### AGA ANNUAL CONVENTION

American Gas Assn. annual convention, Atlantic City, N.J., October 15-17.

### PAINT INDUSTRIES SHOW

34th Annual Meeting, Federation of Paint and Varnish Production Clubs, Netherland Hilton Hotel, Cincinnati, Ohio, October 21-24.

### 10th HOME LAUNDRY CONFERENCE

The Tenth National Home Laundry Conference, American Home Laundry Manufacturers Assn., Conrad Hilton hotel, Chicago, Illinois, November 1-2.

### PEI SHOP PRACTICE FORUM

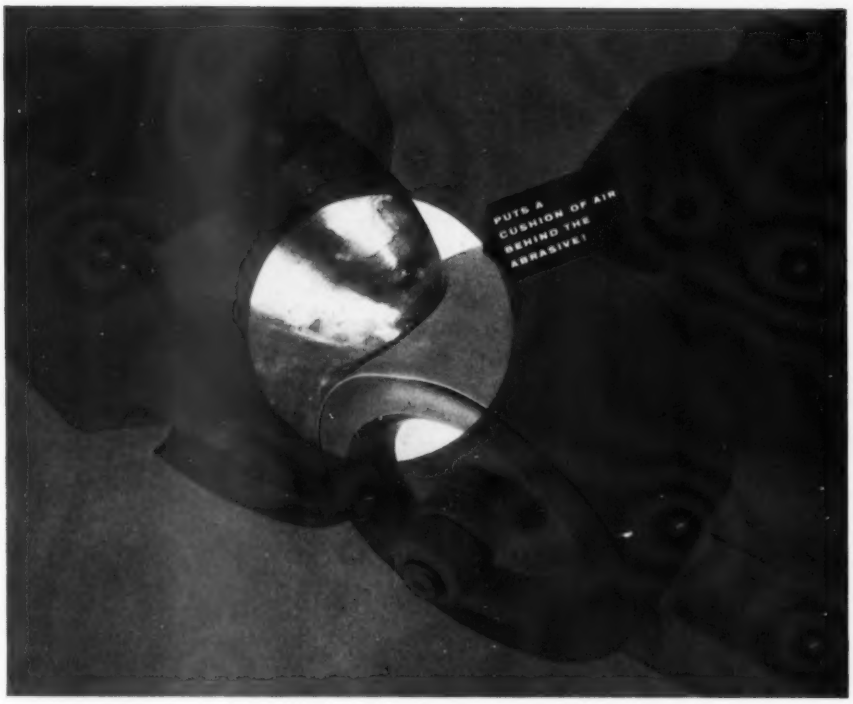
The PEI Shop Practice Forum, Urbana-Lincoln hotel, Urbana, Illinois, November 7-9.

### NEMA ANNUAL MEETING

The National Electrical Manufacturers Assn., annual meeting, Traymore hotel, Atlantic City, N.J., November 12-16.

### ASRE SEMI-ANNUAL MEETING

The semi-annual meeting, American Society of Refrigerating Engineers, Boston, Massachusetts, November 25-28.




# Aircore Method Saves $1242 on Set-up Wheel Operations

Calculate the cost of operating one of your set-up wheel stations. Take ⅓ of that figure and you have the cost of doing the same jobs with Aircore Wheels. Your yearly savings per station can vary anywhere from $301 to $2184 depending on your present regraining costs.

Aircore Wheels are designed to perform the same jobs commonly done with set-up wheels. One large automobile manufacturer used set-up wheels to blend lead filling into rear fender contours. They switched to Model 535 Aircore Wheels using 36 to 48 grit abrasive bands. Not only did they realize considerable savings, but production was increased and a better finish was obtained.

Facts and figures are important, but they are of what others have done. How will Aircore Wheels work on YOUR jobs? How much will YOU save by replacing your set-up wheels with Aircore Wheels? You will know the exact answers when you put an Aircore to test.

DO SO AT OUR EXPENSE. Send for 25-day free trial. Give job requirements and type and size of power tools used.

**THIS CHART SHOWS POSSIBLE SAVINGS WHEN AIRCORE WHEELS ARE USED INSTEAD OF SET-UP WHEELS.**

**If regraining cost per set-up wheel is:**

| If daily number of set-up wheels used by one operator is: | 15¢ | 20¢ | 25¢ | 30¢ | 35¢ |
|---|---|---|---|---|---|
| 10 | $301 | $426 | $551 | $676 | $801 |
| 20 | $464 | $714 | $964 | $1214 | $1464 |
| 30 | $684 | $1059 | $1434 | $1809 | $2184 |

These will be the yearly savings per operator using Aircore Wheels.

N-115

**NU-MATIC GRINDERS, INC.** 8224 Carnegie Avenue Cleveland 3, Ohio

**CHICAGO VITREOUS ANNOUNCES**

**a NEW, IMPROVED**

# LIGHT GREY

# *Alkali resisting*

# GROUND COAT

- **better than ever WORKABILITY**
- **cost reducing COVERING POWER**

Not too many months ago Chicago Vit research set the pace with another "first"—a grey ground coat with high alkali resistance. Since that time there has been a growing desire and need for a **lighter grey** alkali resisting ground coat. Chicago Vit once again answers the need and announces this latest development for use on a wide variety of appliance parts. Here is a 1-fire finish that has outstanding workability, and covering power that lowers the boom on costs. And for added eye and sales appeal there are several companions to the grey **in colors** ! You'll be doing yourself a real injustice if you don't investigate this outstanding new development. Sales wise this may be just what you're looking for. Line up a demonstration today with your Chicago Vit representative or call us direct !

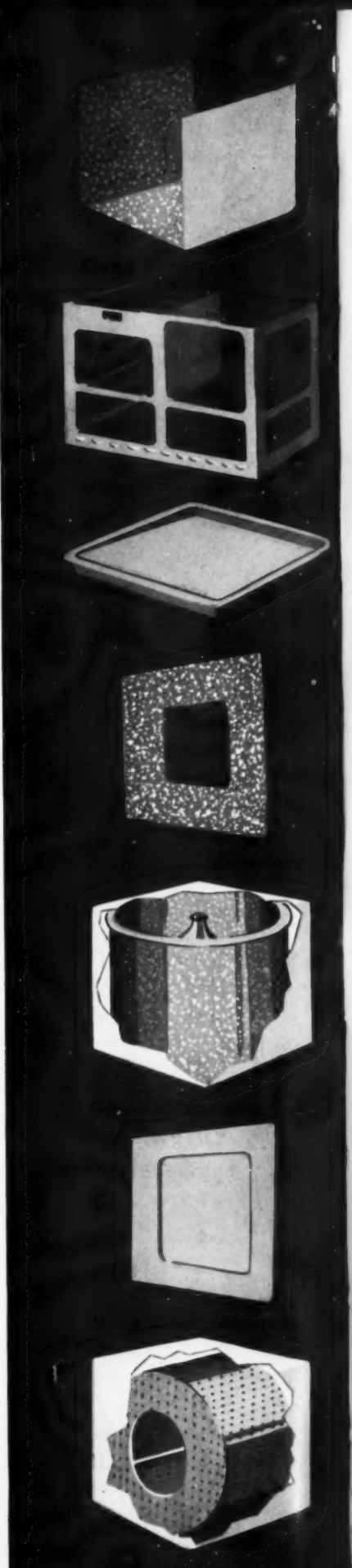
***FOR FINEST FRIT • CHICAGO VIT***

*Chicago Vitreous*

**CORPORATION**

**1425 South 55th Court**

**Cicero 50, Illinois**



# when the time comes...

*for new and better glass products* — whether it be today or 2000 A.D. — Marsco's craftsmen engineering team will develop them.

The Junior Spaceman above has the best in interplanetary protection — a glass space helmet — because glass can be bowed to fit any desired shape and yet it can be tempered to impart extreme resistance to impact.

You or your family don't need space helmets today but chances are glass could improve the utility and beauty of your product and make it more salable today.

Let Marsco's craftsmen engineering team impart to your product all the advantages of glass.

**ask for the man from**

Marsco

***Here are some of the applications for Marsco heat-treated, tempered and hardened glass parts:***

- CLOCK & TIMER CRYSTALS
- OVEN DOORS
- RADAR EQUIPMENT
- AIRCRAFT ACCESSORIES
- PHOTOGRAPHIC EQUIPMENT
- LIGHT LENSES
- DIALS & NAME PLATES
- TELEVISION EQUIPMENT
- INSTRUMENTS
- MEDICAL EQUIPMENT

*Special shapes for: Instruments, Gauges, Household and Industrial Appliances.*

**MARSCO MFG. CO., 2909 S. HALSTED ST., CHICAGO 8, ILL.**

# no other

MANUFACTURER
CAN OFFER YOU
SUCH A WIDE RANGE OF

ING-RICH
FRIT
"The Plant Tested Frit"

*There is a difference*

INGRAM-RICHARDSON, INC.

OFFICES, LABORATORY AND PLANT • FRANKFORT, INDIANA

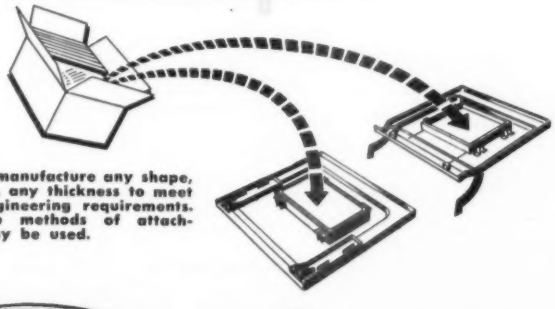
# Dixie one of the first to use PERMA-VIEW WINDOWS

RECTANGULAR

ROUND

SQUARE

TRAPEZOID



We can manufacture any shape, any size, any thickness to meet your engineering requirements. Alternate methods of attachment may be used.

**DIXIE**
**ONE OF THE**
**53 LEADING**
**RANGE MANUFACTURERS**
**USING**
**PERMA-VIEW**

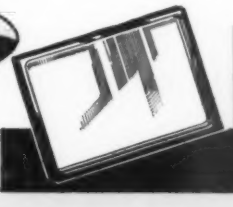
Dixie Products, Inc. was one of the first to use PERMA-VIEW. Now 52 other leading manufacturers are using "the window you can see through always."

The strong steel encased, double pane PERMA-VIEW window incorporates the finest quality heat resisting glass. It is mechanically sealed to prevent infiltration of vapors and to eliminate "fogging." This "No-Fog" window meets the constantly growing demand for "visible baking."

The PERMA-VIEW window is pre-engineered, and comes to you ready for immediate installation in your range — "out of our carton into your door." Let our specialized production lines serve as a part of your sub-assembly facilities. Phone or write us for complete details on the ease and economy of adding this sales feature to your new ranges.

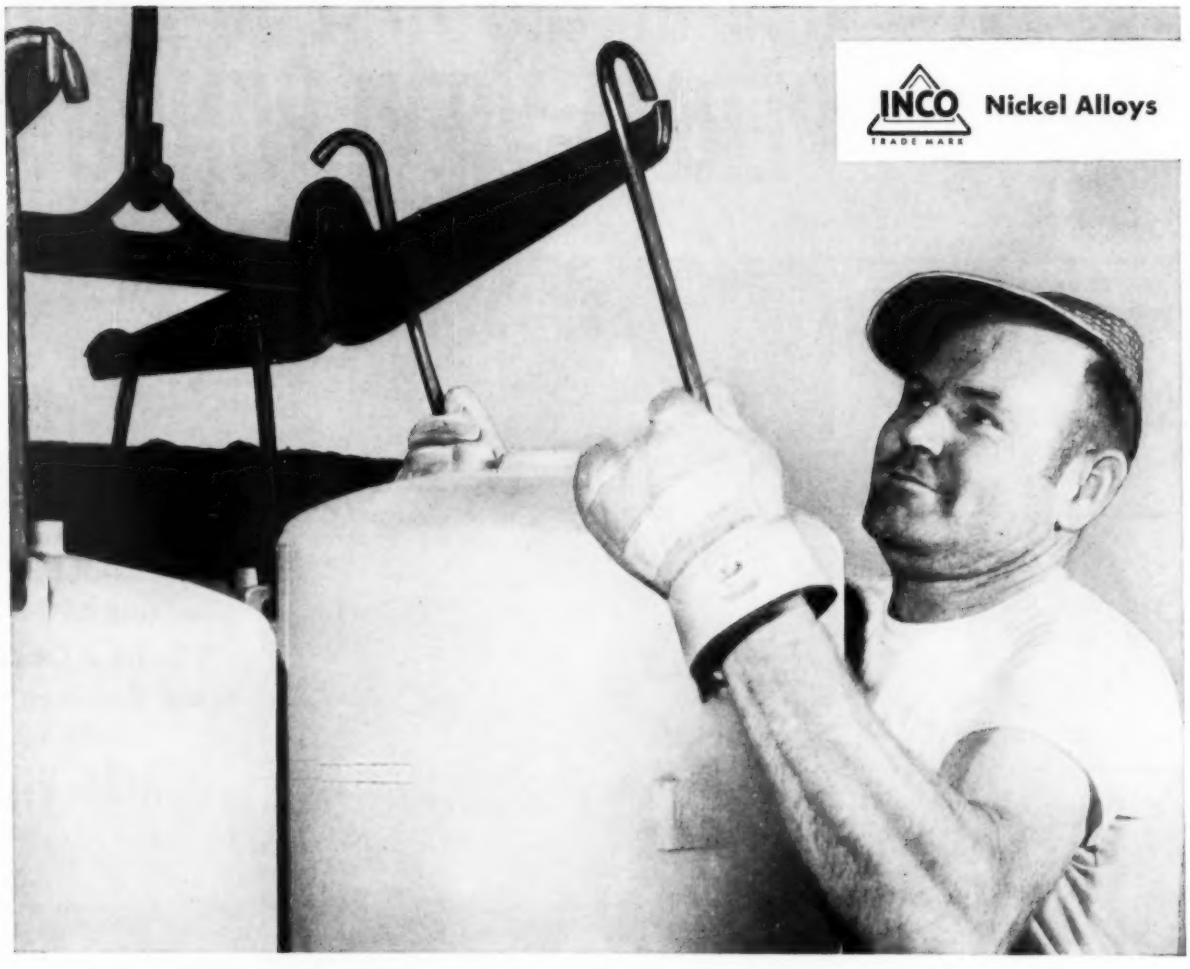
**"out of our carton — into your door"**

GENUINE PERMA-VIEW NON-FOG



**MILLS PRODUCTS INCORPORATED**

1015 WEST MAPLE ROAD • WALLED LAKE, MICHIGAN




**These strong ½-inch Inconel hooks** carry tanks for a water heater . . . have given 27 months' service in continuous enameling furnace operation with not a single failure and many, many months of future service predicted.

# Burning hooks with an earning way!

## *Inconel stops pile-ups on long production runs*

At the Kent Corporation, El Monte, Calif., they enamel workpieces for major appliances. A broken hook on a long production run can cost them *plenty* . . . furnace downtime until they get fallen pieces out . . . spoilage of work in progress.

So Kent relies on rugged hooks of Inconel* nickel-chromium alloy to prevent pile-ups. Inconel, they've found, gives needed "sure" life. It stays strong despite heat . . . despite corrosive attack at temperatures up to 1650°F.

And Kent reports *another* advantage of Inconel: its tightly adhering oxide film doesn't scale readily . . . prevents high-cost spoilage of enameled surfaces.

**Hook up with Inconel** to stop furnace pile-ups. You'll discover other advantages, too. Its easy fabricability. The extra heavy loads it carries. How small, lightweight Inconel fixtures save fuel. You'll discover that Inconel burning tools *earn* their way!

**"Keeping Costs Down As Temperatures Go Up"**

This big, illustrated booklet contains many suggestions on extending equipment life. Write us for a copy.

* Registered Trademark

**The International Nickel Company, Inc.**
67 Wall Street New York 5, N. Y.

# Inconel... *for long life at high temperatures*

# *from the* Editor's Mail

### Modernization in Greece

Gentlemen: Thank you for your kind words in your issue of June, 1956 . . our slogan (literally translated) is "Bringing Civilization to the Greek Home." We strongly believe what we say in our slogan and spare no efforts in improving our products, adjusting everything to the requirements of the average Greek family. This is not an easy task, since we work on a small market (8,000,000) in which importation of foreign goods is completely free. This new model of ours (Shown on Page 67, June, 1956 *finish*) is one of a series which, when completed, will greatly help in modernizing the Greek home and facilitating the work of the Greek housewife. . .

**ISOLA, S.A.**
**Kallithea-(near Athens)**
**Greece**

Ed Note: And thank you for bringing us a picture of Greece and its economy.

### Heaters part of laundry

Gentlemen: . . . . while the common understanding of the term, home laundry appliances, is generally limited to washers, dryers, and ironers, we believe that the modern water heater is a part and deserves attention in your September issue. Separately, we are sending literature on the subject plus our $40,000 non-commercial book "All About Modern Home Laundering" . . . in it you'll find the automatic water heater covered in its true relationship to modern clothes washing. . . . . .

**M. M. Scott**
**Ruud Manufacturing Co.**
**Pittsburgh, Penn.**

Ed Note: finish editors regretted that photos of Ruud's new line were not received in time for inclusion in the September issue. However, Reader Scott should be very pleased with our agreement to his thinking, expressed by the article "Hot Water and washing machines" written by Dotti Hogg of Colgate-Palmolive. In fact, Miss Hogg referred to the Ruud line with most complimentary statements, in her article. Moreover, AVCO's Ann Louise Olson furthered "Ruud's cause" by her statements in her article "New textiles and the miracle fabrics."

### In:re surface finishing

Gentlemen: In:re W. E. McFee's article "How to surface finish stainless steels" (March, April, 1956 *finish*) . . we find them very interesting and wonder if it would be possible to obtain copies for distribution to our abrasive engineers. If so, we would need 125 copies. For what they may be worth, we would like to offer the following comments . . . in the illustration on page 3 (March, 1956, *finish*, Page 25) and Page 61, (April, 1956, *finish*) protective guards are not shown. This is strictly against good safety practice as you will gather from the comments in the publication attached. Perhaps the guards were intentionally omitted for photographic purposes but when this is done, it is customary to so indicate . . on page 25, (March, 1956, *finish*) we wonder if the surface speeds shown are correct. We doubt any grinding wheel manufacturer will sanction use of bonded abrasive wheels of any types at speeds as high as 60,000 sfpm. This is pretty true also for the second item which indicates that coated polished wheels may run as high as 80,000 sfpm. We suspect that these are typos and that the top speeds in each instance should be 6,000 and 8,000.

**R. Van Keuren**
**Manager, — Grinding Wheels**
**Sales Engineering Dept.**
**The Norton Company**
**Worcester, Mass.**

Ed Note: Reader Van Keuren is correct in both instances. The speeds in those two instances picked up a couple of zeros at the print shop and were not noticed in time for correction before publication. As for the photos, Author-of-the-series Bill McFee has assured us that the protective guards were removed only for photographic purposes as Van Keuren supposed. Readers desiring to see the booklet mentioned by Keuren on safety precautions in grinding should write the editors.

### Paint removing machine

Gentlemen: We are interested in a paint removing machine that may be installed to clean Teflon Hangers without removing them from our production line. These hangers are run at approximately 300 per minute . . . .

**J. M. Bradley, Purchasing**
**Crown Cork & Seal Co., Inc.**
**Philadelphia, Penna.**

Any readers with helpful information or suggestions for reader Bradley? We would appreciate a copy of your letter to Mr. Bradley for possible inclusion in next month's "Editor's Mail".

### Request from Burma

Gentlemen: I have enjoyed the help I have received from your periodicals over the years [as chief engineer, Ma-Con Arms, Inc., Subsidiary of Houdaille Industries] and now find my duty assignment shall be under the Technical Assistance Administration of the United Nations as Consulting Mechanical Engineer to the Burmese Government Engineering Project Board. I feel the news and products listed in your publication would be of untold assistance in these projects, and would appreciate, if it is in keeping with your policy, receiving your periodicals at my new professional address . . .

**William M. Ramlow**
**Consulting Mechanical Engineer**
**Rangoon, Burma**

Ed. Note: *finish* regrets that policy requires foreign circulation be on a paid basis but appreciates Reader Ramlow's comment on its value to him and hopes it will continue.

### Editor's caviar

Gentlemen: As you know, I have long been an admirer of your publication. It carries worthwhile information in the manufacturing business. I may have been a little prejudiced about the edition that carried our coffee story (See below)—I thought it was terrific—but the complimentary letters I have received from all parts of the United States with reference to it confirms my high opinion. . . . . .

**Leslie Arnett**
**Treasurer**
**United Coffee Corp.**
**Chicago, Illinois**

Ed Note: The article referred to was "That Amazing New Perk-o-fresh Coffee Vendor" which appeared in the May, 1956, issue. Reader Arnett was writing from the new facilities of the company at 251 East Grand in Chicago, where the company has moved since the story was written.

### requests for tear sheets

Gentlemen: Please send tear sheets of the article entitled "How to surface finish stainless steels". This article was written by W. E. McFee, published in March 1956.

**Richard C. Stroker**
**Metallurgist**
**Barber-Colman Company**
**Rockford, Illinois**

Gentlemen: We are interested in obtaining tear sheets of the article "Slitting and shearing steel — and costs" which was in the February 1956 issue of *finish*.

**A. I. Nussbaum**
**Stanat Mfg. Company, Inc.**
**Long Island City, New York**

Tear sheets have been sent to Mr. Stroker and Mr. Nussbaum.

### Request for July issue

Gentlemen: We would greatly appreciate your sending us an extra copy of your July issue of *finish* magazine. Thanking you in advance . . .

**Richard A. Biggs**
**Mgr. Product Development**
**Crucible Steel Co. of America**
**New York, New York**

Ed. Note: another copy has been forwarded. *finish* editors appreciate readers who find so much of interest in an issue that they want another copy. Much more, they'd appreciate having the particular article of interest pointed out, as it is of great material aid in planning future issues and gaining a better understanding of the needs and the desires of our readers. Even without asking for another copy, readers can help guide the editorial course of *finish* by pointing out outstanding operations — or requesting more articles on particular subjects. Would you help us to help you?

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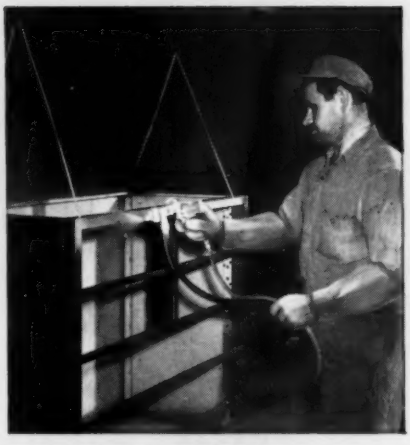

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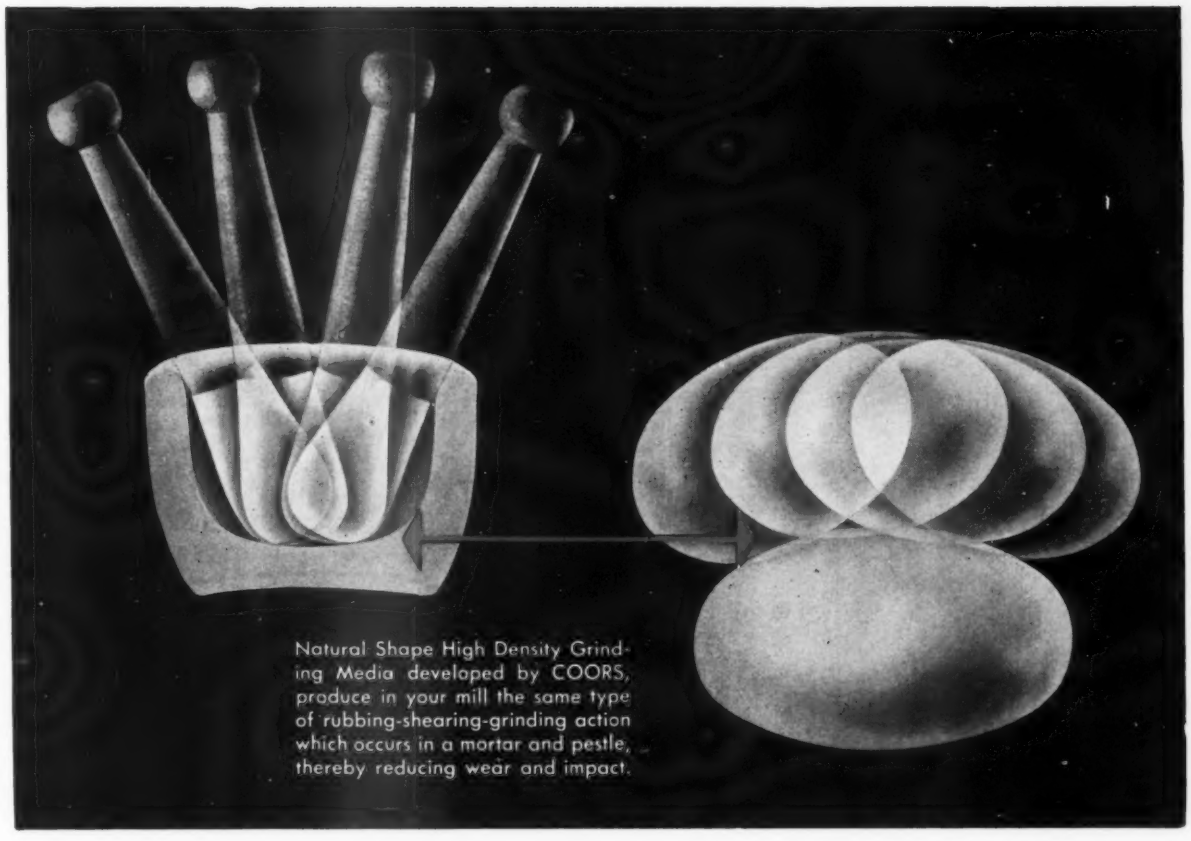
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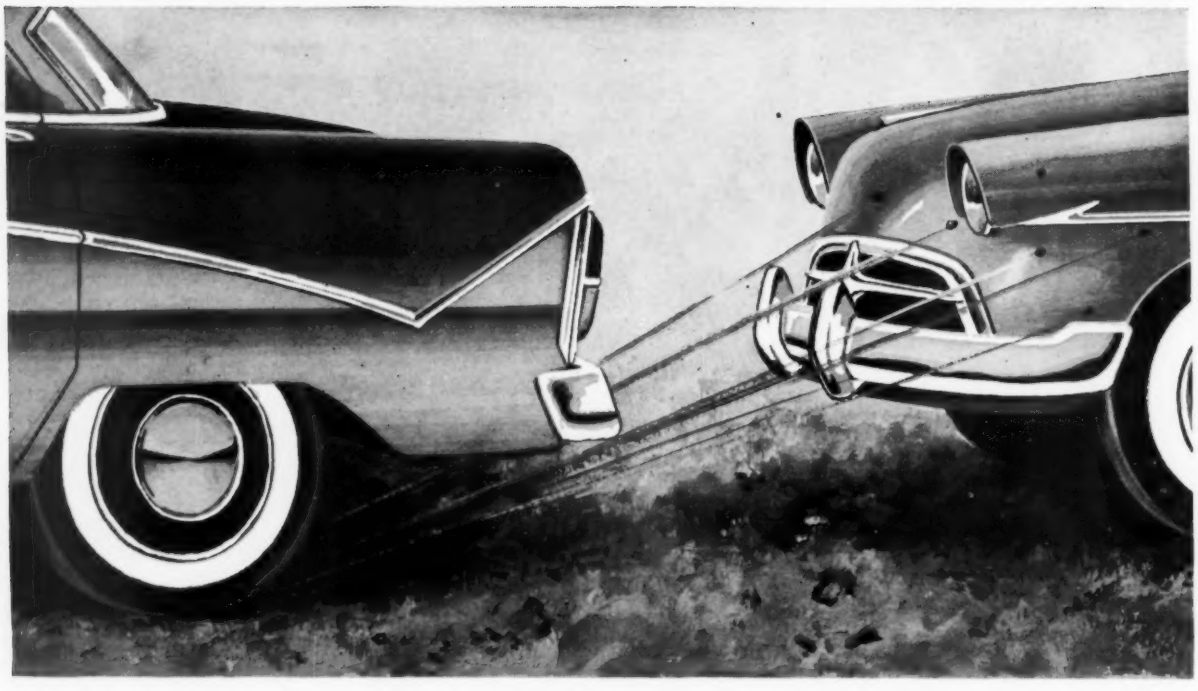

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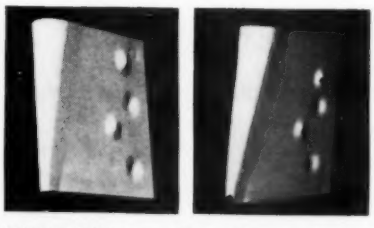
**CHIP-RESISTANCE.** Finishes on Fosbonded panels resist twice the weight of impact as do finishes applied over conventional zinc-phosphate coatings.

**SALT-SPRAY TEST.** No creep of corrosion on Fosbonded panel after 300-hour exposure, while conventional zinc phosphate allows 1/16" undermining of paint film.



**IMPACT TEST.** No paint fractures on impact and bending of Fosbonded panel (left), while paint on panel with conventional coating fractures from same treatment.

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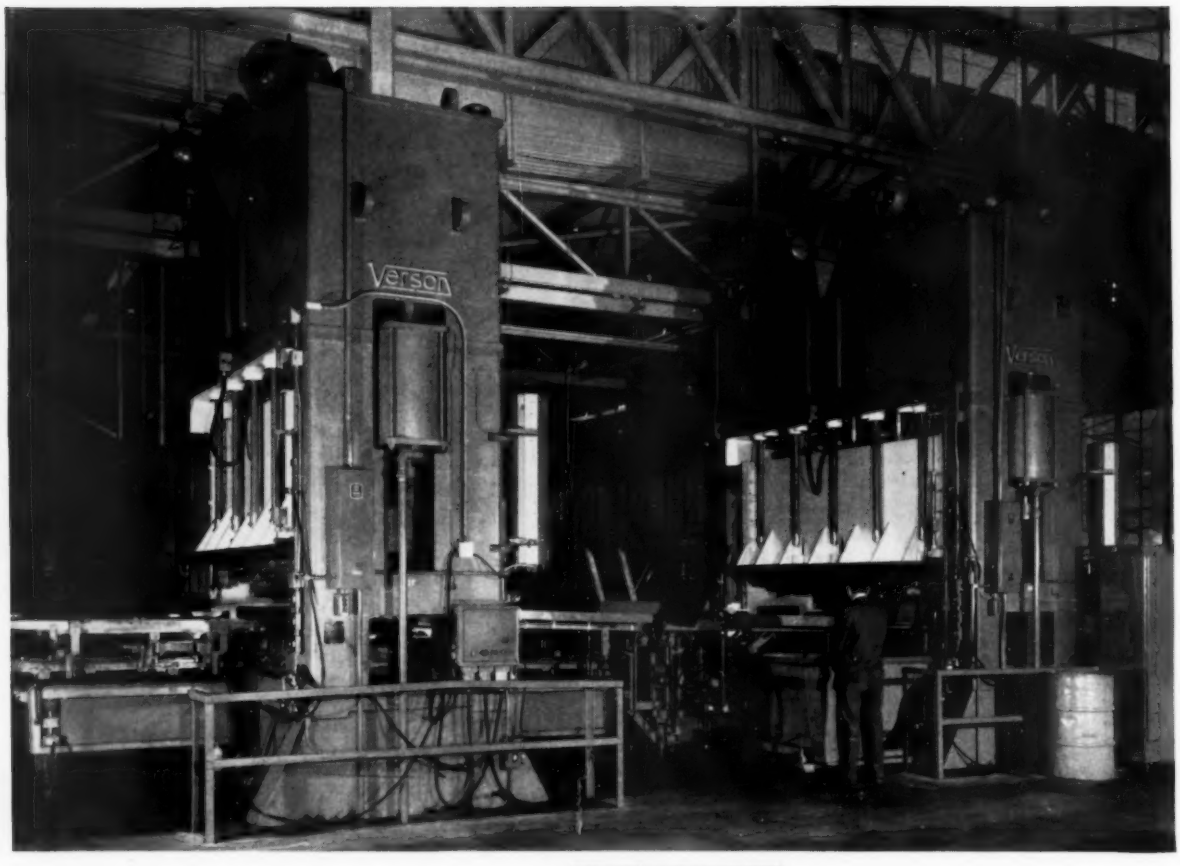


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# Formability of metals

**basic characteristics of metals, materials for cold forming, and divisions of cold forming methods are analysed in this four part special report by Spencer**

*by Lester F. Spencer* • CONSULTANT IN METALLURGY

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THE ABILITY to plastically deform many types of metals is used to advantage in press working operations used in the production of identical shapes on a large volume basis. In many instances, the choice of fabrication procedure will vary, even though the specific shape of the part formed is very similar. This choice of fabrication procedure will be dependent upon such factors as the type of equipment available for forming, the type of material from which the part will be made, and specific design of part to be formed.

For the purpose of clarification, press working operations may be conveniently grouped into four general divisions, these divisions being identified by a specific type of working action, thus: (a) operations which involve a shearing action such as is experienced in either blanking, trimming, punching, perforating, etc.; (b) operations which involve a bending action as is exemplified by bending, tubular forming, curling, expanding, beading and bulging; (c) operations where a drawing action causes the metal to flow plastically from one shape to another under a tensial loading; and (d) operations where a squeezing action takes place which involves, in most instances, compressive strains. This group includes operations such as coining, swaging, sizing and heading.

As indicated above, the procedures that are available in the forming of metals may vary from simple bending to very complex operations as exemplified by a deep drawing operation. As a general rule, the more difficult methods of metal working will require a better knowledge of both the mechanical and metallurgical variables which influence the successful production of semi-finished items at a competitive cost. In considering the metallurgical variables, which frequently are grossly misunderstood by the practical shop man, it can be stated that these variables may also be considered as "basic characteristics" of the metal. Let us consider the more important characteristics that are displayed by metals and determine how they can be used to advantage.

### Analysis of "work hardening"

Work hardening is a generally accepted phenomenon that is associated with many metals. The practical man recognizes this phenomenon in a metal working operation by the increase in hardness and strength of the material that is mechanically worked from blank to completed form. He also observes that the metal becomes less ductile during the process of this mechanical working and, in order to continue the pattern of successful working, it is necessary to anneal the material for the relieval of stress concentrations. This will restore ductility to the formed part and permit further working.

A knowledge of this work hardening property, the rate factor of which is usually determined on the basis of experience, will aid in the calculation of the permissible reductions within an operational sequence as in deep drawing; in determining the number of draw sequences that is required to obtain the completed part; and, to inter-space the required anneals at critical spots within the draw sequence so as to obtain the full benefit of the stress relieval operation.

### "Work hardening rate"

The importance of the "work hardening rate" can be best illustrated with the austenitic stainless steels that are commonly used in the press working operations. Specifically, let us consider those composition types identified as types 301, 302, 304 and 305, the variation of work hardening rate being largely dependent upon the ratio of chromium to nickel within the base analysis. The material identified as type 301 has a relatively high work hardening rate and, consequently, is confined to moderate forming and drawing operations. Where a material is required for deep draws, the stainless types 302 and 304 are chosen; the lower rate of work hardening of these analyses will permit reductions of from 45 to 55% from the original blank before a regenerative anneal is required to restore ductility.

The industry is very much interested in the recently developed type 305 stainless, which has a much lower rate of work hardening than any other stainless type, and, as a result, the deformations realized in a deep drawing or spinning operation before a regenerative anneal is required may be 30 to 40% greater than that realized with the type 302 stainless.

### Grain size characteristics

Another common characteristic which should be carefully considered is the subject of "grain size". The generally accepted requirement for sheet metal work is that the material be of fine-

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Conventional Wringer Washer Produced by Maytag in 1939.

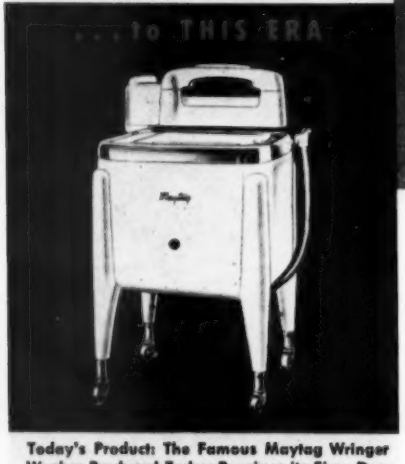


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*FIGURE ONE: fire cracking of an 18% nickel silver drawn shell. Note failure occurring in area of highest stress concentration, the neck which had been spun.*

**FORMABILITY** CONTINUED

grain size. Although there may be some disagreement as to the optimum grain size, it is generally conceded that the importance of this factor is dependent upon the specific operation, and that it is usually more critical where extreme deformations are experienced.

The two extremes may be illustrated. A coarse grain size will produce a characteristic "orange peel" effect on the surface of a drawn shell, this roughness of surface being the result of a difference of flow characteristics of each individual grain. In the event that the surface is to be plated or painted, the elimination of the roughened surface is quite costly and, in many instances, defies removal by polishing.

Conversely, a material that has an extremely fine grain size may emphasize a particular defect. In low carbon steel sheet, for instance, stretcher-strain markings are frequently more pronounced in a fine-grained material. Usually a grain size of 7, using the ASTM standard scale, is considered satisfactory for moderate or deep drawing operations.

In the event that the established optimum grain size is a part of a specification, it is desirable to maintain this optimum grain size throughout the operational sequence. However, it may be necessary to consider both the metal and the method used in processing in relationship to the intermediate anneals.

Some of the low carbon ferritic steels and a number of the aluminum alloys along with electrolytic tough pitch copper may develop large grains during a recrystallization anneal that has followed limited reduction, this phenomenon being related to the "critical grain growth" of the material. One of the more common preventative procedures is to stress relieve below the recrystallization temperature of the material in question.

### When "grain size" not important

In the event that the operational sequence will involve compressive strains, the subject of grain size is not as important. In an operation that involves coining, impact extrusion or ironing, a comparatively large grain will have the advantage in that less power is required for deformation. Regardless of the operation type, consultation with the vendor can establish this optimum grain size for the specific job and, due to his wide experience, operational sequence can be established so that a reasonable retention of the fine grain size can be realized.

### The phenomenon of aging

Stretcher strains, the phenomenon of aging, which is prevalent in low carbon sheet steels and some aluminum alloys, will produce a surface disturbance during press working operations which is associated with the so called "stretcher strains" or "Lueder's lines". This surface roughness is particularly objectionable on formed parts that will have either a painted or plated finish. Although low carbon sheet is supplied in a temper rolled condition, the sheet material having been cold reduced from 0.5 to 2.0% to eliminate aging which may have occurred, the steel will revert to an aged condition after a certain period of time.

This time period will vary from a week to several months depending upon such factors as the composition, the method of manufacture, the percentage of skin or temper rolling, the original hardness of the material and both the time and temperature of storage. Stretcher strain markings are also influenced by the rate of forming; the low carbon steels that may appear free from this surface disturbance at slow rates of forming may exhibit this defect upon forming at higher speeds.

### Minimizing stretcher strains

It is well known that aging can be minimized or even eliminated by the application of a cold rolling operation; this frequently is performed directly at the fabricator's plant as a roller leveling operation. In many cases this operation is standard in that all sheet that comes from storage is roller leveled prior to actual forming. Roller leveling and other cold working operations prior to actual forming have the disadvantage in that they harden the material and thus reduce its full capacity to deform plastically.

The aluminum killed steels are a good insurance against stretcher strains, and, for all practical purposes, may be considered as a non-aging material. For this reason, this material is frequently specified for very deep draw work, or, for items which are intermittent in production which necessitates a long storage period for purchased sheets. One objection of aluminum killed steels is that the surface may be objectionable, which may cause high rejects. In this respect, the vanadium killed steels are reputed to have all the advantages

of the aluminum killed steels in addition to a surface condition acceptable even to the highest finish requirements.

In any event, the fabricator should specify the specific conditions of operational procedure and end use of the formed part when ordering sheet material; this includes a print of the finished part, operational sequences, finish desired on end product, etc.

### Phenomena of directionality

Due to the processing variables existing in the break-down of an ingot to a finished mill product, there will be a difference in properties when transverse and longitudinal sections are compared. This phenomenon is frequently termed "directionality", "anisotrophy" and, at times, "fibering"; the magnitude of which will depend to a large extent on the processing history.

The two types of directionality that exist can be identified as (a) "mechanical fibering" which is associated with change of shape from ingot to finished form and (b) crystallographic directionality which is associated to the internal changes of the grain structure of the metal. In considering sheet steel and strip products, the latter type of preferred orientation is quite common. It is readily identified by the "earing" that is obtained in cupping and drawing operations, the cup having usually four, although sometimes two or six ears or "scallops". The height of these ears indicates the extent of directionality within the material. This phenomenon is objectionable in that it not only increases trimming scrap, but also may cause breakage in the event that the directional properties may be rather severe. In any event, non-scalloping sheet stock is available; the slight extra cost is well worth the trouble that is eliminated.

### Failures in forming

Stress cracking occurs in a number of materials such as exemplified by the austenitic stainless steels, the high nickel alloys and many copper base alloys.

This phenomena can be caused by a number of conditions, thus: (a) the cracking of the drawn item may be due to the magnitude of a stress concentration in the area of failure; (b) failure may be due to a combination of circumstances involving both stress concentrations and contamination of atmosphere, this type of failure being usually termed 'stress corrosion cracking'; and, (c) failure may be caused by a sudden application of heat, such as may be exemplified by placing a cold worked item directly into a hot annealing furnace. In this instance, too rapid and unequal liberation of stress will cause failure. This often is referred to as 'fire cracking'.

### Stress corrosion cracking

In a stress cracking phenomena, which is entirely due to excessive cold working of the drawn shell, the shell may crack either in the press or shortly after the item has been formed. In our experience, this has occurred more frequently in the austenitic stainless and the low carbon deep drawing steels. The cause is usually due to operation previous to the draw which precedes the cracking.

In stress corrosion cracking, which in our experience has occurred more frequently with copper base alloys, the conditions which may lead to failure may be summarized as (a) the existence of high tensile stresses such as would occur in tightly screwed bolts and hanger rods; (b) the presence of a corroding medium within the atmosphere, even to traces so slight that it cannot be detected by sense of smell, moist ammonia being considered as dangerous for the copper base alloys; and, (c) the element of time. Usually if any of the above factors are eliminated, the danger of stress corrosion cracking is reduced.

### Stress cracking prevention

Fire cracking, as previously mentioned, is attributed to the rapid and unequal relieval of stress concentrations within the part. This type of failure usually occurs in shapes which have been stressed unequally during forming, as exemplified in Figure 1, failure occuring in the area where the reduction is the greatest. Figure 2 also illustrates this phenomenon. The remedy for this type of failure is to provide a pre-heat operation prior to the introduction of the shell into the annealing heat.

A method in prevention of stress cracking is the use of a relief anneal. The time and temperature of annealing is dependent upon such factors as (a) the metal composition; (b) the severity of deformation; (c) the probable distribution of stress concentrations within the part; (d) the degree of softening permitted; and, (e) the anticipated service of the part.

As a guide, the following temperatures can be employed, thus: (a) the carbon steels can be heated to a range of 1000 to 1200 degrees F., (b) the stainless steels can be heated to a range between 1000 and 1150 degrees F.; however, in the case of the austenitic steels, a full anneal should be included as a final operation so as to eliminate the effect of carbide precipitation obtained during the relief anneal.

In many cases, a full anneal at 1850 degrees F. is given the preference over a relief anneal., (c) the copper base alloys can be heated to a range of 325 to 525 degrees F., the specific temperature depending upon the alloy composition, (d) the magnesium alloys are heated in the range of 300 to 600 degrees F.

**About the Author**

Lester F. Spencer is a research metallurgist and consultant who has been active in the field for over 20 years. In 1937 he was an instructor of metallurgy. He has been a metallurgist in Alloy Development for Republic Steel and chief metallurgist for Diebold, Inc., and Landers, Frary & Clark. In 1953 he was a research metallurgist for Naval Research Laboratories in Washington, D.C. He holds a B. S. degree in Chemical Engineering from Marquette University and a M. S. degree in Metallurgical Engineering from Wisconsin University. He is a registered professor of engineering and a member of the American Society for Metals and The American Institute of Metallurgical Engineers.

**IN NOVEMBER**
**PART TWO: THE CARBON STEELS**

# FEDERAL WELDING PRESS . . .

## a complete seat frame with every press stroke!

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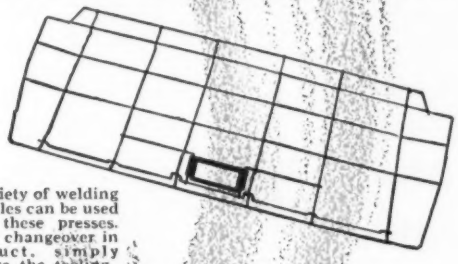
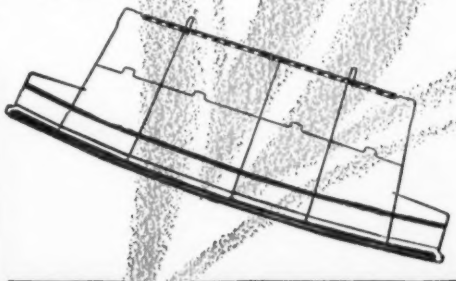
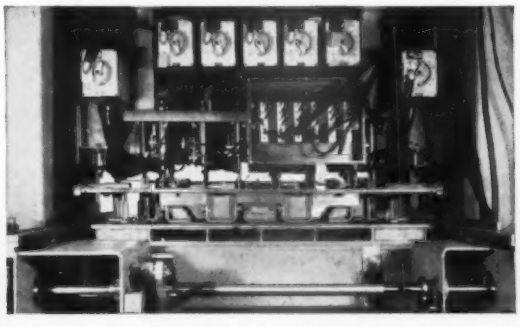
Only Federal can offer single company responsibility in supplying both the mechanical welding press and the welder tooling based on their long experience in both press (Warco) and resistance welder (Federal) manufacture.

There are many manufacturing operations existing today where a mechanical welding press would pay dividends. If you have one of them, why not contact the one company best suited to provide the answer? That's *Federal — First in Resistance Welding*. Welding Press brochure on request.

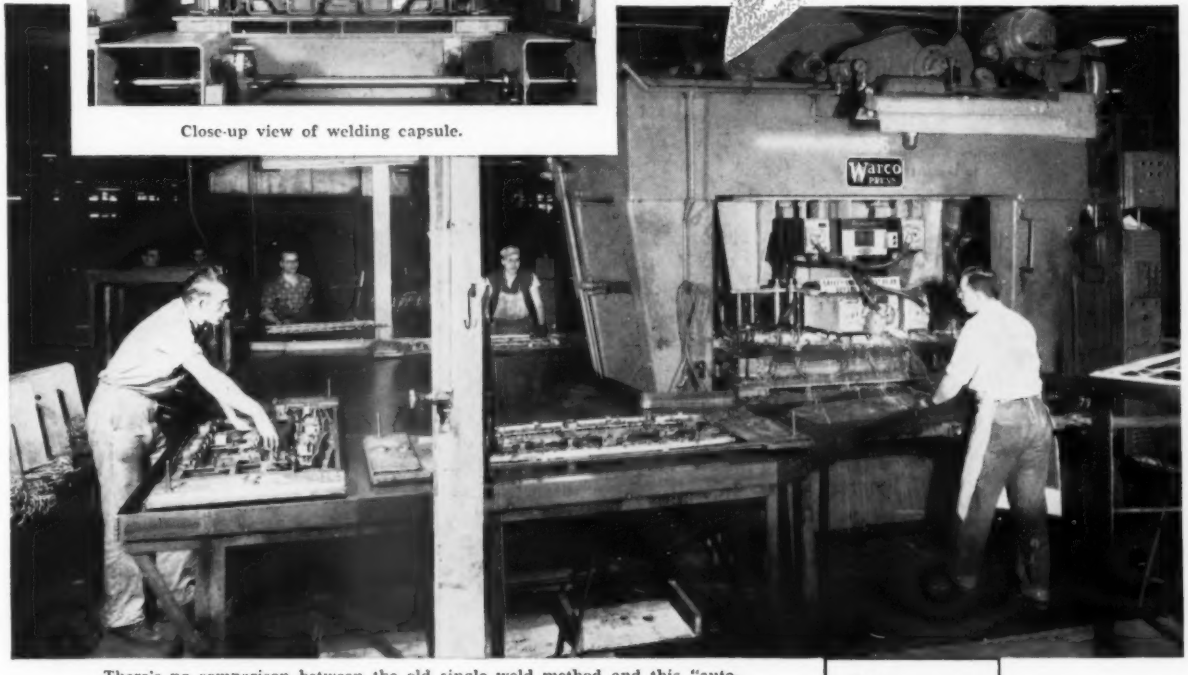


A variety of welding capsules can be used with these presses. For a changeover in product, simply change the tooling.





Close-up view of welding capsule.




There's no comparison between the old single weld method and this "automated" production line made possible through the Federal Welding Press.

Federal® WELDERS

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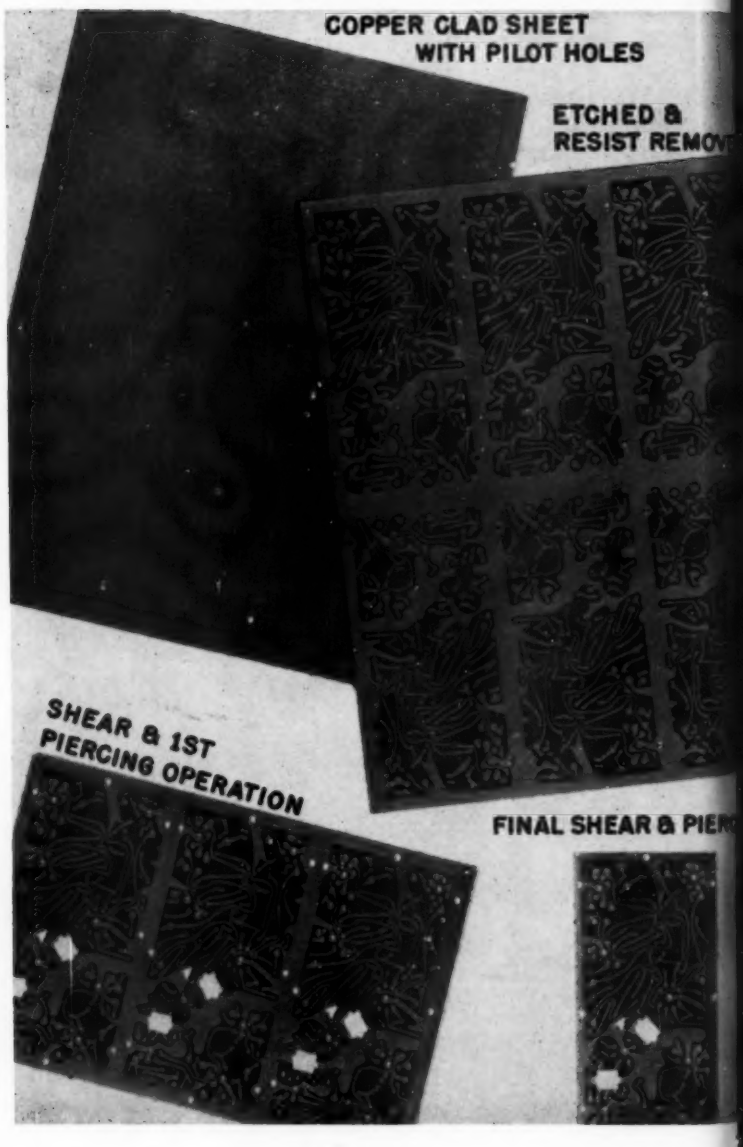
**The Federal Machine and Welder Company**

**WARREN, OHIO**

Warco® PRESSES

# The potential of printed circuitry in major appliances




**what they are, how they are made and potential in manufacturing—are given thorough study by Kent**

*by C. F. Kent* • SALES MANAGER, PRINTED CIRCUIT DIVISION, CRONAME, INC.

PRINTED circuitry in the major appliance industry is a young and vigorously growing field, and at the outset let me say that we, as manufacturers of printed circuits, do not pretend to know its applications and potentials except in a general way.

We are, however, continually amazed at the widespread interest by industry in general. For instance, a single advertisement a few weeks ago brought no less than 142 inquiries from greatly diversified sources from coast to coast. So, while we are impressed and enthused with this developing field, we cannot begin to show specific uses in any industry at this time.

What we can do to help your thinking in this direction is to tell you what a printed circuit is, how it is made, and some general rules in working out the current carrying capacities needed.

### What is a printed circuit?

Now, as to the first item: What is a printed circuit? It could be defined quickly as an electrical conductive pattern, usually copper, produced on an insulating surface. It replaces conventionally wired circuits making possible much smaller, lighter and more reliable assemblies. It replaces the complicated maze or wires by a neat package unit, simplifying assembly operations by permitting the use of less skilled labor and, at the same time, reducing the chance of error.

This is one development that has been a tremendous factor in automation, particularly in the electronic field. It would appear that with so much emphasis on automatic assembly, here is a development you cannot afford to overlook.

As for the second part: How is it made? There are probably 25 to 30 methods of manufacturing a printed circuit; however, by far the most popular

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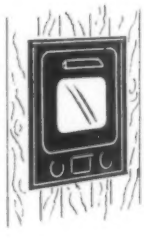

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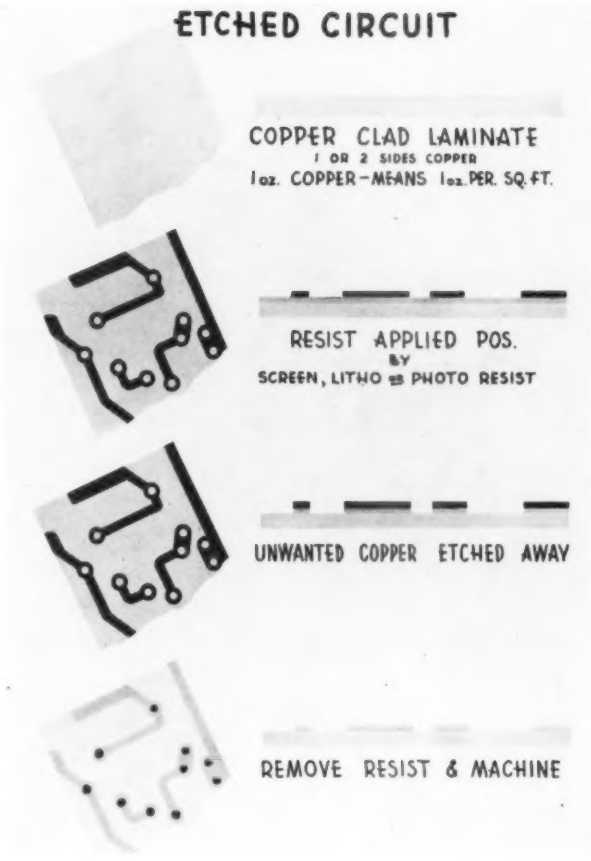


**PRINTED CIRCUIT** CONTINUED

type is the etched circuit which includes a combination of laminating, printing, etching and, if desired, electroplating.

The laminating step is to produce the insulating base, or support, and at the same time laminate a thin layer of copper to either one or two sides. The most popular insulating board is a paper base phenolic, which is the least costly. However, under certain electrical and moisture conditions it might be desirable to consider an epoxy, melamine, or other type. The printing and etching steps are shown in an accompanying illustration.

### Quality control procedures

To insure proper registration of the circuit pattern to later machining operations, pilot holes are pierced in the copper clad phenolic sheet. Using these pilot or registration holes, an acid resist is applied by printing, silk screening or photographically, leaving the unwanted copper exposed and the circuit pattern protected. It is then etched, usually, in ferric chloride which eats away the unwanted copper areas. After etching, the resist is removed, and the circuit is then ready for machining.

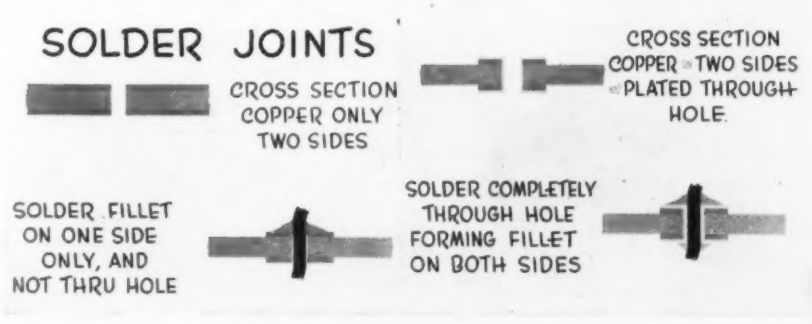
There are no great tricks or secrets to the machining operations. The usual rules of good machining practice hold on these parts as on metals, except the minimum hole size can be reduced to approximately 2/3 stock thickness for punch press operations.

From a processor's viewpoint, it is desirable to use one of the cold punching phenolics that are available. This simplifies the machining operations, as it is easier to handle than hot punching materials and is somewhat better dimensionally. The hot punching stock tends to grow under heat and does not return constantly to exact predetermined locations, which necessitates greater blueprint and assembly tolerances. We have established what we feel are necessary tolerances on all basic type insulating materials which are available upon request.

### Work with plated finishes

If any of the various plated finishes are required, this procedure is varied somewhat, since the plating itself serves as the acid resist. In the plated finishes

*to Page 34* →


SOLDER JOINTS
CROSS SECTION COPPER ONLY TWO SIDES
CROSS SECTION COPPER TWO SIDES PLATED THROUGH HOLE
SOLDER FILLET ON ONE SIDE ONLY, AND NOT THRU HOLE
SOLDER COMPLETELY THROUGH HOLE FORMING FILLET ON BOTH SIDES

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almost all kinds are available — solder, nickel, silver, rhodium, etc. A silver flash gives short term protection against corrosion and helps in the soldering operations. Solder plate serves purely as a soldering acid. Nickel provides wear resistance and is good for wiping contact surfaces. Rhodium over either nickel or silver is a hard non-corrosive wear resistant finish which is excellent for continuous contact surfaces, but it is expensive.

### Clean copper surface needed

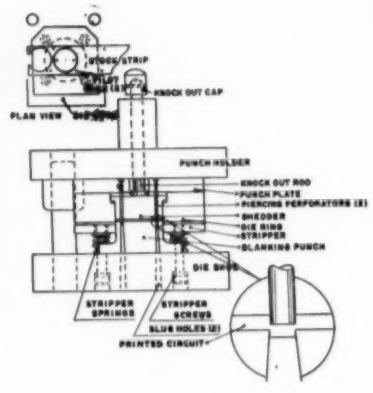
For general printed circuit applications, a good clean copper surface, either burnished or chemically cleaned, protected by a flux coating or water dip lacquer, seems sufficient and is the least costly.

For some of the general rules for working out the current carrying capacities, we refer you to the above chart. You will note a conductor line only 1/64" wide on 2 oz. copper will safely carry 3 amps. A line 1/16" wide will carry 15 amps. and 1/4", 35 amps. Incomplete tests indicate a 1/2" conductor will carry approximately 70 amps. The spacing between the conductors will have to be determined dependent upon specific requirements.

In those instances where cross-over connections are necessary, a conductor pattern may be applied to both sides of the insulating board, producing the desired third dimensional effect.

### Underwriters agree on use

No doubt some of you will be questioning Underwriters' attitude toward this development. It is our understanding that they would be open minded on any application. The unit submitted would have to withstand the same heat and electrical tests that any conventionally wired unit would require. No item would be rejected just because it utilized a printed circuit.




## CURRENT CARRYING CAPACITIES

| LINE WIDTH INCHES | APPROX. OVERLOAD CURRENT FOR FOIL LINES 0.00135 IN. COPPER AMP. | 0.0027 IN. COPPER AMP. |
|---|---|---|
| 1/64" | 3 | 5 |
| 1/32" | 5 | 8 |
| 1/16" | 10 | 15 |
| 1/8" | 15 | 20 |
| 1/4" | 23 | 35 |
| 1/2" | | 75 |

### Underwriters' approval given

In this same vein, I might add that, as a printed circuit producer, we have Underwriters' approval on our processes under their re-examination services.

Probably the most interesting and practical single factor is the ease and speed with which a printed circuit can be assembled and soldered, particularly in an automated setup. One of the most fascinating sights in industry today is to watch a printed circuit board start through the automatic assembly machines and follow it through the various stages until after the final soldering operations.

Certainly recent developments in automation in the electronics industry, using printed circuit boards, can be put to good use in the major appliance field.

The use of Printed Circuits in any application requires considerably less copper than conventional wiring methods. Continual increasing of electrical applications means more and more copper is being consumed. It is possible, however, that at some future time it will become necessary to devise methods of conserving copper to maintain adequate supplies for high quality production and defensive needs. The printed circuit is one approach toward copper conservation.

C. F. Kent

Where printed circuits will fit into the individual appliances — and I'm confident they do, and will fit in — is something for your engineers to consider. We at Croname will be glad to help anyone with all the assistance our engineers can provide, and will also make samples to help test any applications you may consider; however, if I were an engineer looking for a place to use printed circuits in major appliances, I would look first for switch plate and control panel applications.

**"THEY MANUFACTURE A COFFEE MAKER THAT CONTROLS THE TASTE"**

Printed circuitry has found a place in a new commercial coffee unit which will be given full editorial and pictorial broadcast in an upcoming issue of *finish*. The manufacturers' engineers have wedded an electronic tube with a printed circuit in a new coffee brewing system that results in an outstanding feature, "automatic taste control." Engineering details, as well as the full story of its production, will be presented in a special report now being prepared by a team of *finish* editors, and photographers. The report should provide some provocative thought for manufacturers who are seriously studying the potential of printed circuitry—looking for the "how" to incorporate it into their own major appliance lines. Look for the report in an upcoming *finish*, The Magazine of Appliance and Metal Products Manufacturing.

THE EDITORS

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**E. I. du Pont de Nemours & Co. (Inc.), Finishes Div., Wilmington 98, Del.**

# How Adams Rite finishes small parts

**a non-technical description of plating and finishing operations in a West Coast plant producing cabinet and builders' hardware and aircraft fittings**

*by Gilbert C. Close* • WESTERN EDITOR FOR FINISH

finish

PRODUCTION of cabinet hardware seems like a relatively simple manufacturing operation. There is nothing complex about the products. A few punch presses, a few drill presses, some turret lathes, and a draw press or two will perform all the necessary production operations. But when it comes to the finishing operations, we find some very complex finishing systems that must be employed to obtain the numerous different finishes required on this type of work.

### Simplicity of production

A tour through the polishing, plating and painting shops at Adams Rite Manufacturing Company, Glendale, California, large producers of quality-type cabinet hardware and fittings for aircraft, would dispel the "simplicity of production" idea. Here, in a department about 60 by 150 feet in size, are 30 tanks that average 300 gal. capacity each. Twenty of these tanks are electroplating tanks, each applying a different type of finish. In addition, there is a complete anodizing set-up, ball mills, burnishing mills, bright dip installations, hand finishing installations, drum plating equipment, rotary dryers, and a miscellaney of smaller equipment too numerous to list.

### The most popular finishes

About 20 people work in this department to keep this outlay of equipment in operation. Of course, not all of the tanks are used at one time, and some of them quite infrequently, but the solutions and equipment must be available and ready to go when a certain type of surface finish is required.

Among the more popular finishes applied are (1) Polished brass; (2) Satin and bright brass; (3) Satin and bright bronze; (4) Satin and bright nickel; (5) Satin and bright chrome; (6) Statuary bronze applied by hand finishing; (7) Anodizing on aluminum; (8) Cadmium on steel; (9) and clear baked enamel on brass.

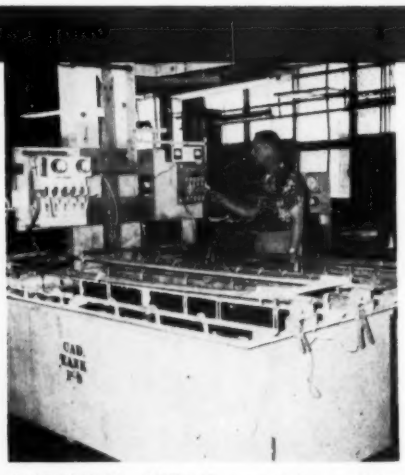
### Bronze is major metal

A large percentage of the hardware is made either of solid brass or a bronze composition running about 70 per cent copper and 30 per cent zinc. The aircraft fittings are usually of aluminum. And some sheet steel builders hardware is produced. This variety of materials further complicates the finishing problems, especially insofar as cleaning and pre-plating preparation are concerned.

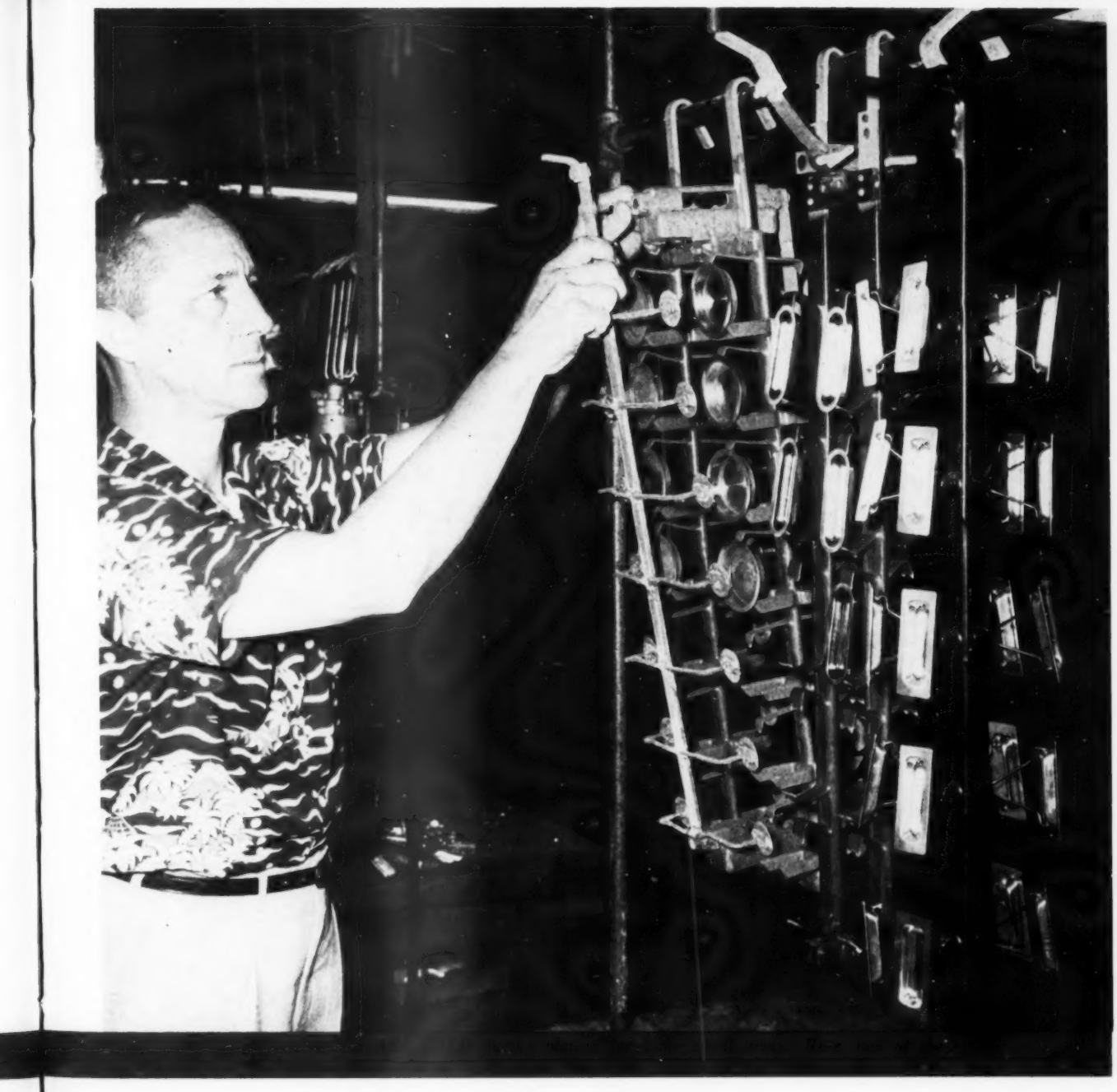
Some of the plating solutions are conventional; others are "company developed". The bronze plating solution now employed required some 2½ years of intensive research and trial before the desired results could be obtained.

*100 YEARS OF EXPERIENCE is represented by the six operators in the polishing dept., who are responsible for polishing each part before it is plated.*

*TUMBLING BARRELS are used to deburr the sheet steel hardware items prior to the plating operation. Aluminum oxide balls are used as metal abrasives.*



*CADMIUM SET-UP at Adams Rite. This department contains facilities for applying more than 20 different metals and finishes, providing a wide latitude.*



Solution maintenance in so many tanks is a major problem. All solutions are analyzed once each month by an outside chemical laboratory so that they can be balanced out as a starting point for the next 30 days. Daily pH readings are made within the plant on each tank. Experience relative to throwing power and plating time aids in solution maintenance. The solutions are filtered periodically to remove all organic impurities, while metallic impurities are plated out using a large, corrugated steel sheet and 42 volts DC. It is interesting to note that during this "plating out" process, copper always deposits near the bottom of the corrugations, while nickel deposits near the top of the corrugations. Jerry Nahring, finishing supervisor, points out that this plating out process is very effective in removing all metallic impurities from any of the solutions.

### Oscillating electrode used

Some of the tanks have been specially equipped to step up plating speed and to obtain specific results. The bright nickel tank, as an example, utilizes an oscillating electrode from which the parts to be plated are suspended, thus keeping them in constant movement. A hot solution is employed also in this tank, along with a somewhat higher than usual current. These three modifications substantially increase the plating speed. On the other hand, satin nickel finishes are applied in a cold tank at usual voltages and minus oscillation and require much longer to apply.

Many of the tanks (anodic, chrome, etc.) are provided with their own current source by means of a motor-generator set. Handling in and out of the tanks is all by hand due to the miniature size of the products. As many of the products are hollowed out in shape, and because many plating solutions will not throw well into a hollowed out figuration, special internal anode hangars were designed for this type of work (See fig. 5). These hangars contact the work at the bottom of the hol-

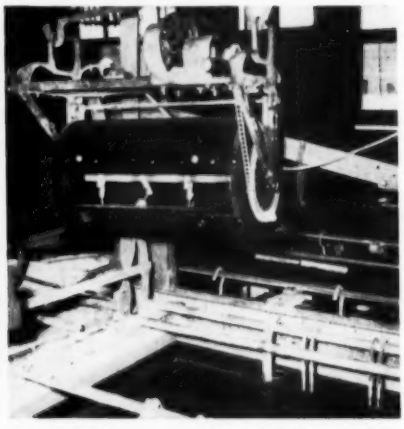
BRIGHT DIP 4

*HAND OPERATED small bright-dip set-up used for some parts. Parts are then dipped in a wetting solution and processed through a small rotary dryer.*

HAND FINISHING 6

*SPECIAL EFFECTS, such as aged brass or statuary bronze type finish, is obtained by hand finishing. A visual timed operation, it is an oxidizing process.*

BARREL PLATING 7



*TUMBLING on finish, plating metal is suspended inside drum, making cathode contact with parts as they tumble against it while barrel revolves in the solution.*

**SMALL PARTS** CONTINUED

lowed portion to facilitate a good deposit in the hollowed portion.

The anodic set-up for anodizing aluminum (mostly aircraft fittings) is complete in itself. A sulphuric solution is used. A motor-generator set furnishes current at the rate of 12 amp. per square foot of work surface. After anodizing, the parts are sealed for 15 minutes in boiling water. This provides a sealed anodic coating which meets aircraft and government specifications by being able to withstand salt spray corrosion tests for at least 250 hours. A refrigeration unit is used on the anodic tank to keep the solution at a cool 70 degrees F. despite the heavy current involved.

Special equipment in the department includes tumbling barrels for deburring the steel work. Aluminum oxide balls are employed in this operation. Burnishing barrels utilizing steel balls with burning powder are available to "pean" smooth various non-ferrous parts. Hand-manipulated bright dip facilities are available when required, and a small centrifugal dryer is used to speed the drying of small parts. The sequence of operations with the last two mentioned pieces of equipment is as follows — bright dip, immersion in a wetting solution, then into the centrifugal dryer. Plating barrels are used on some tanks for the plating of very small parts (See Fig. 7). These barrels have proved very effective in obtaining evenly distributed and adequate platings.

A summary description of the production cycle on hardware will include many ideas that can be employed in other types of production. At Adams Rite Manufacturing Company, production can be logically divided into two categories — the production of proprietary builders hardware items and the production of items to a customer's part number. The proprietary items may be produced in bulk lots and stored in boxes in an unfinished condition until they are needed; production of parts to a customer's part number usually is done on receipt of the order.

In either case, when parts go into the finishing department, they are first degreased in a trichlorethylene degreaser and then go into the polishing department for pre-plating preparation. The polishing department is a revelation in efficiency for hand operation. The irregular shape of the numerous types of builders hardware and aircraft fittings makes overall automation impractical. All polishing is accomplished by hand. The six operators in the polishing department have a total of more than 100 years of hand polishing experience.

### Polishing sequence

With most items, polishing involves a scheduled series of operations. For a bright finish the products are first given an emery grind, and then a grease on a belt charged with tallow composition. This is followed by a buff using tripoli powder, then a color finish using white lime to charge the wheel. For a satin finish the emery and grease treatment is followed by application to a scratch wheel charged with a cutting agent. About 99 per cent of all work is polished

*to Page 56* →

PROTECTIVE COATING 8

*CLEAR ENAMEL is sprayed on small items. This coating is applied to preserve the original plated finish from tarnish when exposed to air.*

INFRA-RED BAKING 9

*BAKING ENAMEL is done in this 475° infra-red oven. Baking time for enamel on aluminum parts is about 3 minutes. Enamel on brass, a 9 minute bake.*

# does this make you think of

# rising metal prices?

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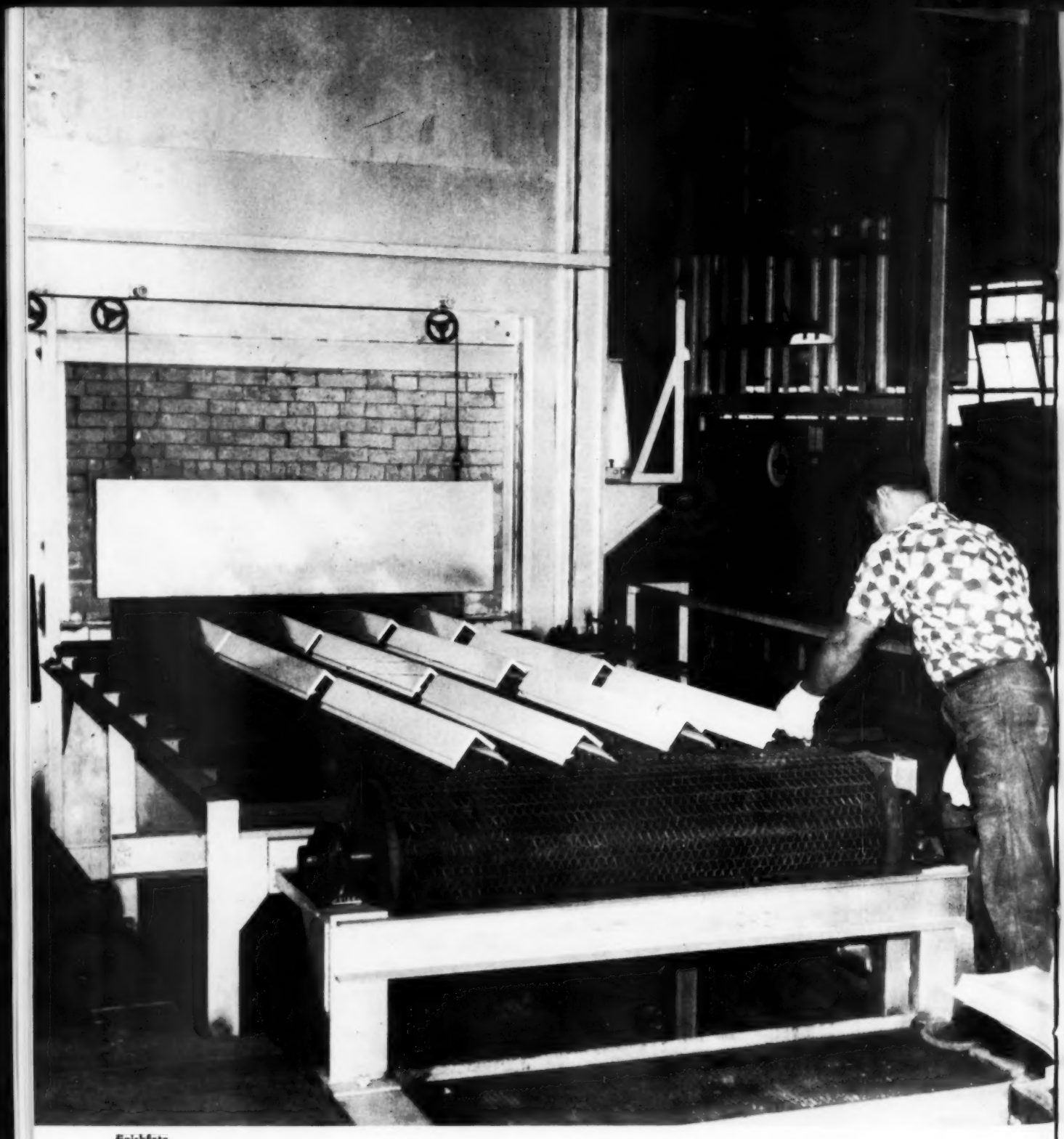


finishfoto

THIS is the second in a current series of special reports on low (980°-1250° F) temperature enameling and of the developments concerning it. These reports are part of a special series of editorial features focused on the field of porcelain enameling: plants, furnace engineering, special application equipment, and formulation developments. Now in the formative stages is a comparative study on suggested methods for cleaning aluminum or aluminized steel for porcelain enameling. Also being prepared is a report on low temperature box type furnace which should serve as a companion piece to this report on a chain belt conveyor continuous furnace. In last month's issue, Elmer Dany, vice president and chief engineer for Ferro Corp., Cleveland, O., outlined the developments that are a part of this "new era for enameling furnaces."

THE EDITORS.

# Low temperature porcelain enameling

**Progress report on Porcelain Steel Corp's new division: details on their low temperature convection furnace and mass production set-up for enameling aluminum and aluminized steel**

*by Frank H. Thomas* • VICE PRESIDENT AND GENERAL MANAGER

Exclusive feature finish

DEVELOPMENT of a division that can provide production facilities for the manufacture of architectural porcelain enameled aluminum alloy and aluminized steel panels marks a big step in the advancement of Porcelain Steel Corporation, Connersville, Indiana.

Our plant previously had only full fabrication and porcelain facilities for standard temperature enamels on steel. The present addition was the result of our management's thinking—that the need for facilities to mass produce architectural porcelain enameled aluminum panels is in our immediate future. Architects, we know, are becoming more and more enthusiastic over the use of this material as they become acquainted with this tremendous development. This growing enthusiasm matches our own as we expand our own knowledge of the material. The advantages of wedding the virtues of glass with the versatility of aluminum, creating a product with the superior qualities of both, and the additional strength given to the metal, needs only fuller understanding to create an ever expanding demand.

### Commercial possibilities announced

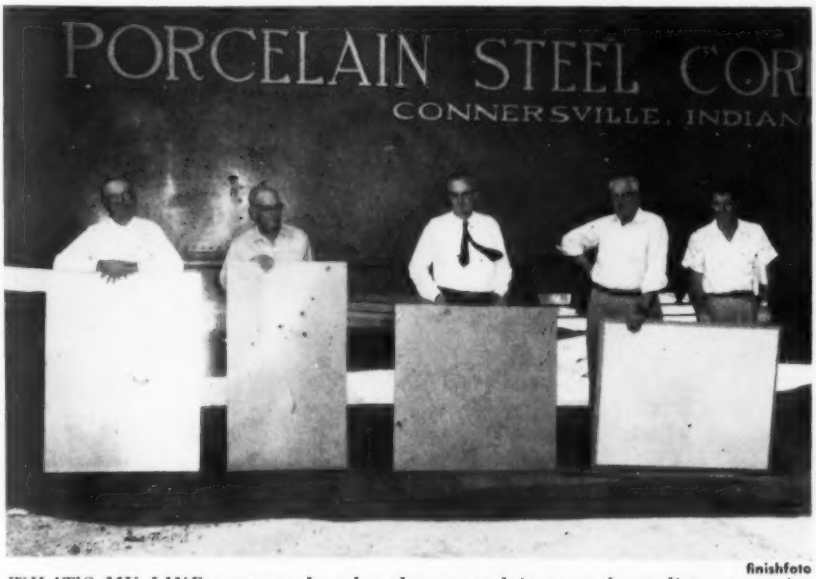
While the possibilities of this product had always been of interest to us, actual development of a plant, and the product, had to wait until research had produced a ceramic coating with a maturing temperature that was suitable to the metal. All previous ceramic finishing for this market had been for base metals where 1500—1600° temperatures were common, and the slip formulations and furnace designs were beamed toward this level.

Ceramic finishing of aluminum alloys became a commercial possibility early in 1951 when formulations were announced on a low temperature glass that would have the desired properties parallel to the ceramic finishes on the higher temperature scale. However, the maturing temperature of these new formulations coupled with the low melting point of aluminum creates a particular and delicate problem in firing. Actually, the fusion temperatures of the enamel is such that it shaves close to the point where aluminum will not support itself. In fact, the enamel fuses within 200 degrees of the melting point of the aluminum and aluminum alloys.

The main obstacle to face us, at this point, was the need for adequate facilities for firing aluminum. This was a major problem since it is well known that as the operating temperature of a furnace decreases, temperature control becomes more acute and at the 1000° level, this problem is a primary one. Moreover, the lower temperature coupled with the shorter burning cycle used for aluminum enameling created especially difficult problems since it was imperative that the product being fired obtain an almost immediate—and more important — absolute "soak" to keep the metal under control and prevent warpage.

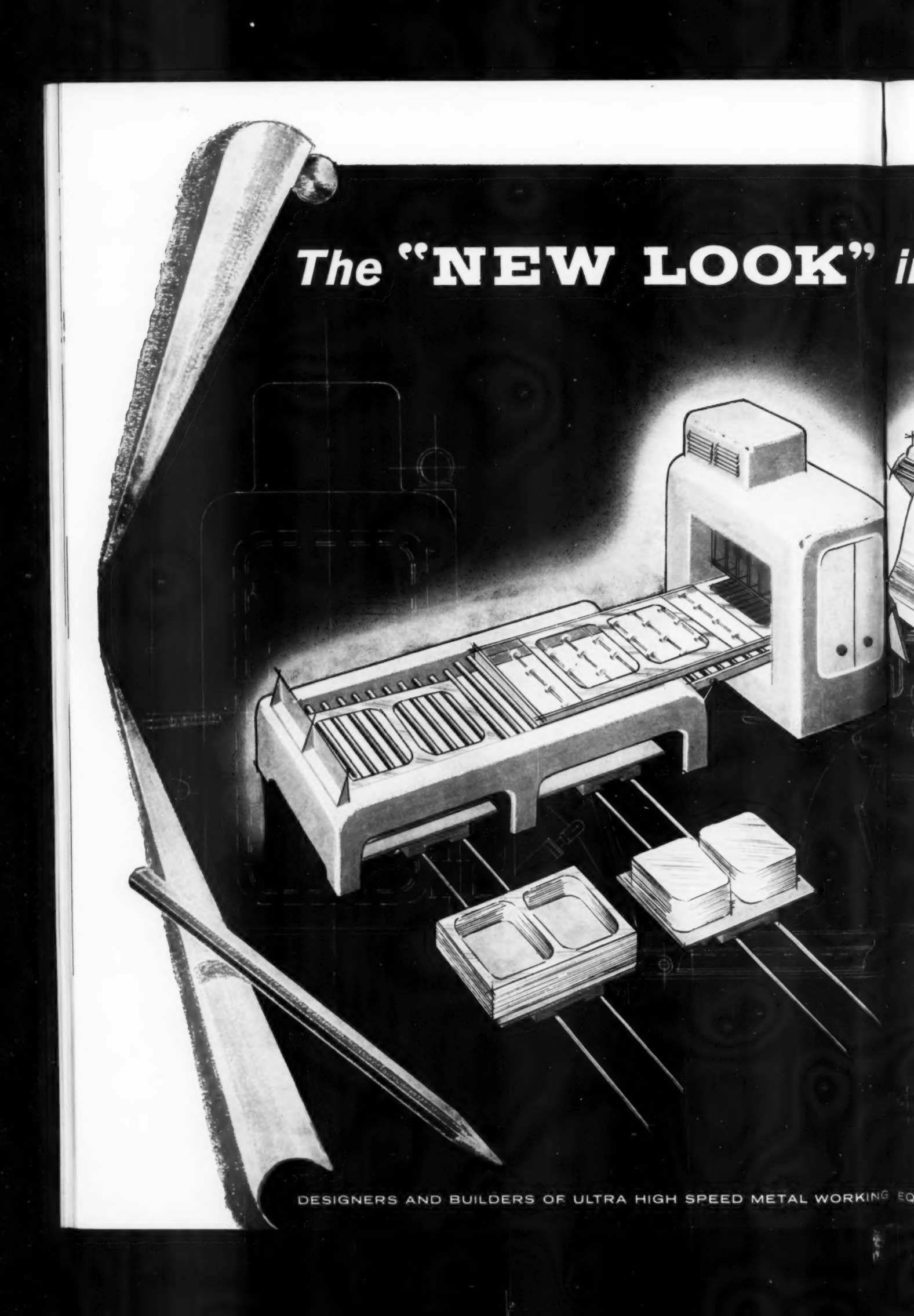
### Re-education of engineers

Problem two was to develop our engineers to a full understanding of the function and correct operational data necessary for mass production of first quality ware. The great pool of experience which we had developed through the years in porcelain enameling steel proved of limited value in this medium. It took a great number of man hours of pilot work, firing tests, and laboratory tests for our personnel to arrive at the point of self assurance where they could competently cope with the

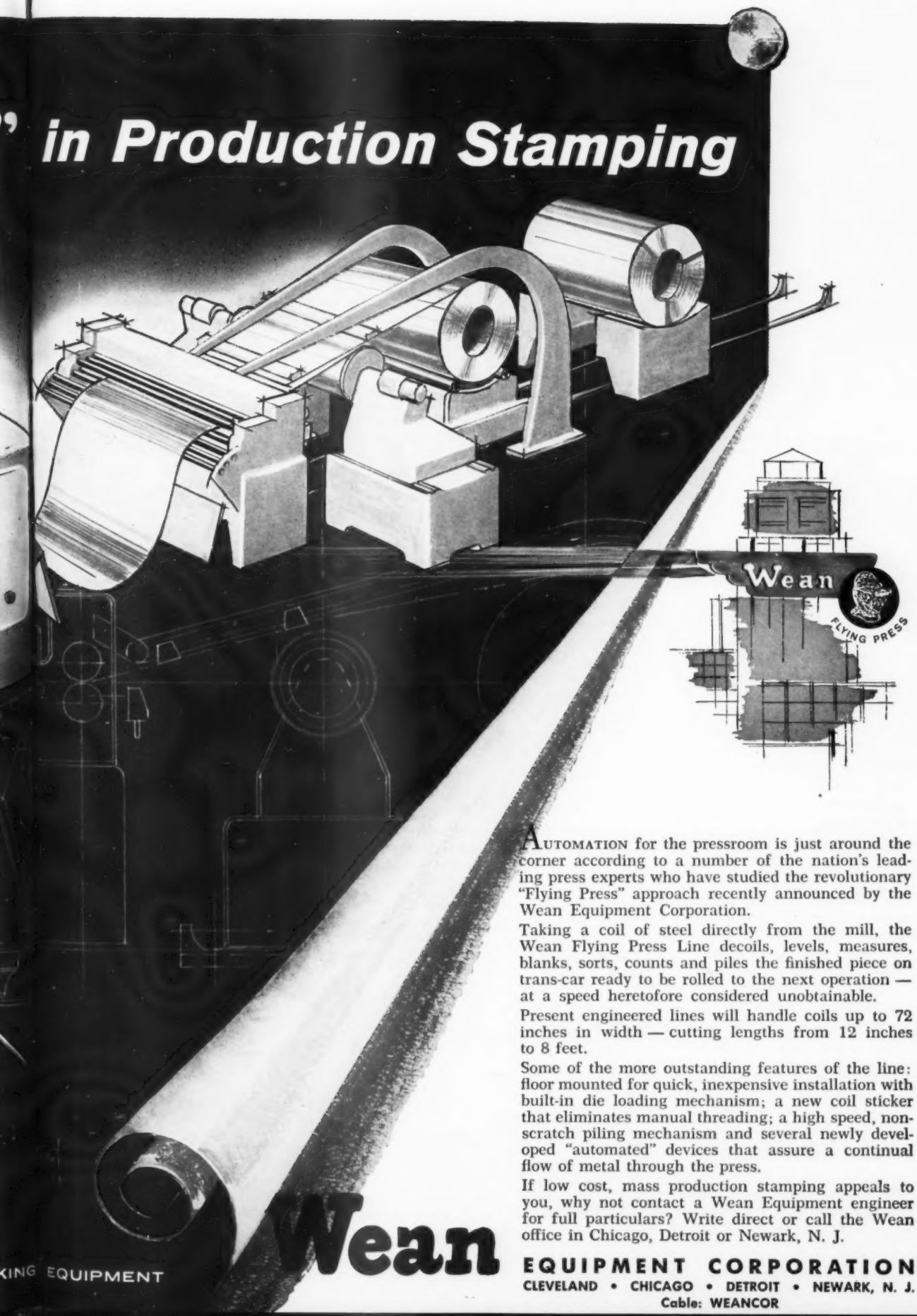



finishfoto

*WHAT'S MY LINE seems to be what these porcelain enamel panelists are saying in this photo taken at Connersville, while they show off some of their line of architectural panels. Left to right are Porcelain Steel Corp. President Theodore G. Harris, Frank Thomas, vice president, general manager and author of this report; L. M. Burgdoerfer, and E. R. Weisheit, vice presidents; and Fred Parvis.*


The "NEW LOOK" i
DESIGNERS AND BUILDERS OF ULTRA HIGH SPEED METAL WORKING EQ

# ” in Production Stamping




AUTOMATION for the pressroom is just around the corner according to a number of the nation's leading press experts who have studied the revolutionary "Flying Press" approach recently announced by the Wean Equipment Corporation.

Taking a coil of steel directly from the mill, the Wean Flying Press Line decoils, levels, measures, blanks, sorts, counts and piles the finished piece on trans-car ready to be rolled to the next operation — at a speed heretofore considered unobtainable.

Present engineered lines will handle coils up to 72 inches in width — cutting lengths from 12 inches to 8 feet.

Some of the more outstanding features of the line: floor mounted for quick, inexpensive installation with built-in die loading mechanism; a new coil sticker that eliminates manual threading; a high speed, non-scratch piling mechanism and several newly developed "automated" devices that assure a continual flow of metal through the press.

If low cost, mass production stamping appeals to you, why not contact a Wean Equipment engineer for full particulars? Write direct or call the Wean office in Chicago, Detroit or Newark, N. J.

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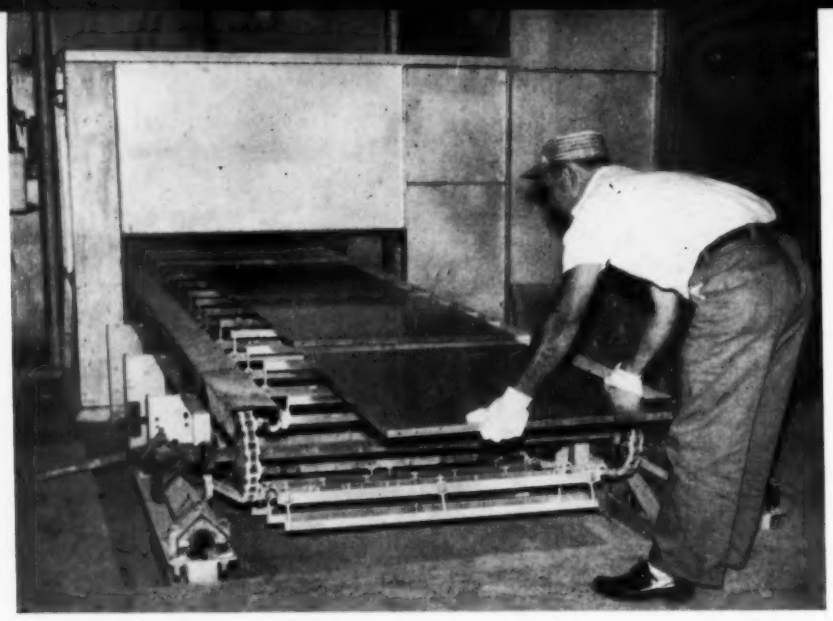


*FROM CLEANING, parts are transported to the flight conveyor which starts material through the automatic paint section. Here the handler (Note white gloves to prevent any contamination of cleaned metal surface) feeds panels onto unit.*

**LOW TEMPERATURE** CONTINUED

problems to be faced in ceramic finishing aluminum or aluminized steel.

This re-education was coupled with the installation and test out of the furnace line which was specifically designed for low-temperature enameling and is a part of our new operation.

### Set-up of furnace line

Our furnace line is a straight line operation and from beginning to end of the unload section measures 93′8″. It was installed to provide mass productive capacity for architectural panels and provides us with a capacity for 3,000 square feet per hour.

We have what we believe is the only chain belt laydown conveyor set-up for porcelain enameling outside of the metal tile industry. The cleaned metal is laid down on a 50 ft. long flight conveyor which feeds through the automatic spray booth, through two manual spray booths and along an open-hooded area until it reaches the furnace changeover point. Here, a roller conveyor (12″ wide) takes the part and feeds it at the correct speed onto the chain belt conveyor which travels through the furnace. This chain goes through the preheat zone, then directly into the hot zone and out running some 12 feet in the open air, sufficient time to allow the ware to cool so that it can be inspected and handled with cotton gloves.

Preparation of the porcelain slips is done in our extensive milling facilities and fork trucked to the line spray booth area. The single cover coat applied directly to the metal is made up of predetermined proportions of $Al_2$, $Al_5$, and $Al_7$ frit, 3 percent sodium metisilicate, 3 percent boric acid, titanium dioxide opacifier as required, with 45% water added. The full charge is ground until its fineness shows no more than .2 gram, for 50 cc sample, retained on a 325 mesh screen.

The slip used in providing back-up is made up of recovery, with scrapings from the booth walls and floors. In addition, a vacuum air fan draw through a dry pan provides for recovery, while serving to keep the atmosphere of the booth in a clean condition. This recovered scrap is ground, thinned to the proper consistency, with no virgin slip added, and is then ready for application.

### The automatic spray section

Fabricated aluminum pieces are sprayed on both sides simultaneously in the automatic spray section. Twin fixtures, one above the flight conveyor and one below, hold the spray guns used in the operation. This set-up is of the reciprocating type. The guns, themselves, are of special importance in this particular type of application since they must provide a fine, low velocity spray to assure a smooth even spray.

Since porcelain enamels for aluminum are very viscuous and do not flow or smooth out appreciatively in the firing, a slightly smaller spray tip and needle combination is used in the guns than those normally required in applications on steel.

On the finish surface of the metal, application is controlled so that the ware will have a four mil fired coat. On the reverse, the slip, which is made from reclaim, is applied to achieve about a 3 mil thickness in the fired coat. This back-up coat is provided, primarily, to prevent warping.

After the automatic application, the piece goes through a pair of staggered spray booths. Here, the application is inspected and the operator sprays along the edges of the ware. This is duplicated in the second booth. Flat ware, incidentally, does not require this operation.

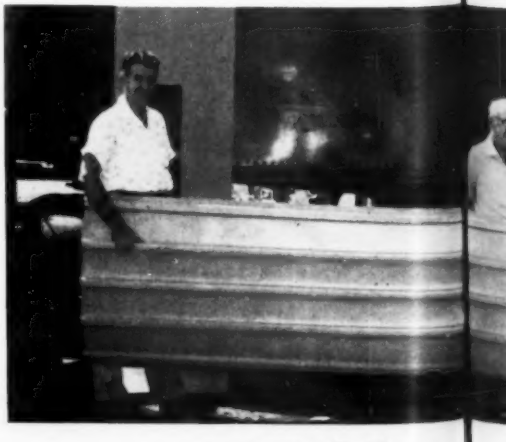
### Air drying of sprayed panels

As it leaves the booth to enter the dry off area, the appearance of the wet sprayed surface is very much like that of the fired enamel's appearance. Dry-off is accomplished as the flight conveyor moves the 20 feet to the switch-off point and the ware is fed onto the mesh belt furnace conveyor, in a continuing straight line operation. This area is completely hooded to prevent any contamination of the air. The amount of time spent in dry-off has been carefully regulated since it need be continued only until all surface moisture disappears.

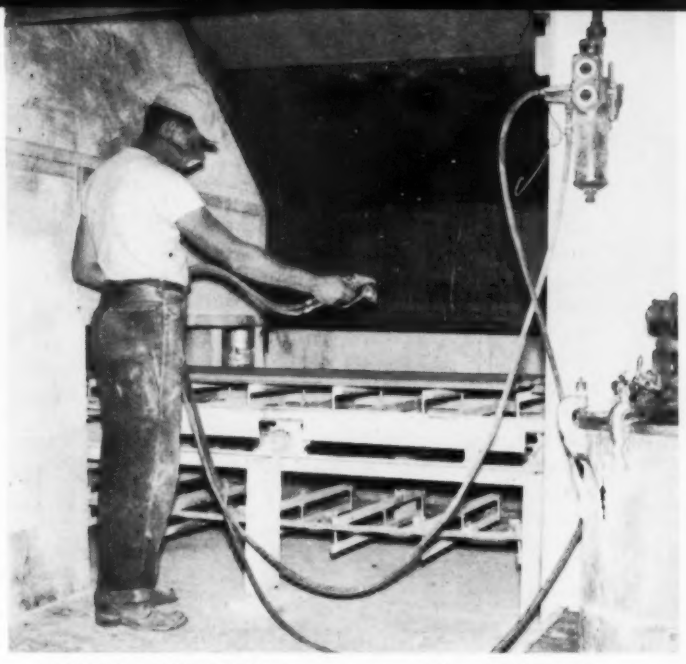
The furnace proper consists of two basic sections, the pre-heat zone and the firing zone. This two stage operation is required since it is of extreme importance that the evenness of the heat be carried completely through the part, in all its dimensions, during the firing cycle.

The ware flows at a constant rate, regulated by belt speed. This speed depends upon the ware being processed. Ware is in the 860°F. preheat atmosphere for a period of approximately 2½ minutes. This zone is both convection and radiation heated, and utilizes a bank of gas fired alloy radiant tubes. The burners are equipped with latest

**22 FEET LONG, LOW TEMPERATURED**



*AUTOMATIC SPRAYING is accomplished in this totally enclosed booth. Booth doors have been opened to show spray gun set-up and reciprocating gear train. Duplicate set-up sprays back up on panel from below conveyor.*



*MANUAL SPRAYING is done as quality check to be sure each panel has had a proper paint application. The operator is also responsible for brushing all edges of panel. This, however, is not required on flat panels.*

control devices. Any difficulty, such as failure of the fan action, or gas supply, results in an immediate cut off of the entire gas firing system.

**Immediate saturation obtained**

Ware goes from pre-heat into the firing zone where it almost immediately reaches temperature of maturity for the coating. This is obtained by the design of the straight-through convection furnace, which fires at a recorded temperature of 1000°F. This results in an even distribution of enamel maturing temperature of 980°F. (±5°). Ware remains in the furnace zone for a period of 2½ minutes traveling 12 feet in the area.

The unique features of this particular furnace include several worth special attention. First, this is a convection type furnace which has proven out the most satisfactory method we have so far discovered to provide the evenness of heat required.

Furnace heat is provided by a multiple coil electric resistance installation. This heat source is installed within the hot air supply duct immediately downstream of the circulatory fan, which is itself located outside the furnace proper. Each individual coil in the electric resistance installation is series controlled and temperature variations are immediately corrected by the automatic switching on of one, two, three or more of the separate coils. The spasmatic clicking of this master control box, as you stand by the furnace recording board, is a constant reminder of this device's automatic and ever constant service.

The sole source of heat for the furnace proper comes from this electric coil system. Air is forced, by the fan, through the duct containing this electric heat pack. The heated air continues its flow down and under the conveyor chain where it is forced into the furnace proper, up and through the ware being fired. The hot gases then continue to the top of the furnace where they are drawn out through the crown, and back into the constant circle by the fan mechanism which is used to force the air over the electrical coils, forming the complete recirculating system.

**Install stainless steel chamber**

Our furnace was installed with the crown of the furnace area made up of

**RATURED PORCELAIN ENAMELED ALUMINUM PANEL SHOWS VERSATILITY OF OPERATION**

finishfotos

*22 FEET OF PORCELAIN ENAMELED PANEL is shown in the photo at left with members of the staff holding the panel to give an approximation of its tremendous length. Author Thomas reports that the length of panels which they can make is limited only to the physical barriers of the plant housing structure.*

regular refractoriers and refractory mortar in the conventional manner. A stainless steel liner butted against the refractory walls and crown was installed. This dust free stainless steel firing chamber eliminates any possibility of contamination within the furnace proper.

The furnace as it is now operating records in such a straight line that should we attempt to show a drawing of the recorder chart it would reveal a straight line through the 1000° mark during full production after initial start-up.

### Extreme sizes possible

Our furnace can handle sections up to 40′ long and 54″ wide and 8″ high. In fact, if we had a customer who wanted it longer, we could do it merely by opening the door at the end of the building, since the enclosure walls are the only limitations we have on the length of the ware.

All parts leaving the furnace travel on in the open air for about 12 feet. This has proven to be sufficient time for cooling of the ware so that it can be handled by men wearing cotton gloves.

Cotton gloves, incidentally, are an important part of this operation and are not just for protecting the hands. Actually, the cleaned parts are handled *only* with white cotton gloves at the entrance as well as the exit end of the line since absolute cleanliness of the surface is of prime importance and finger marks can be very visible if ware is fired after handling with bare hands.

The number of operators at the exit end of the furnace depends, of course, upon the size of the ware being manufactured. Ordinarily, one operator can handle the output of the furnace, giving the ware preliminary inspection at the same time. The ware is then placed onto an inspection table in an area which is flooded with fluorescent light, providing a "daylight" inspection of every area on the metal surface before it can be stamped as okay and passed.

Two methods of handling fired ware are now in use. Should the part be a piece which needs packaging, this is done immediately after inspection and the boxed parts then transported directly to the shipping area. Flat parts are pallet stacked for shipment or, if we are to complete the panel, are carried by pallet and fork truck to our fabrication section where the enameled pieces are made up into complete panels, according to customer requirements, and then shipped from that section.

### Full line of products

The present Porcelain Steel Corporation facilities for ceramic finishing aluminum or aluminized steel are such that we can handle a diversity of product requirements which includes building panels, corrugated siding, roof decking, extrusions, castings and stainless steel parts. This is in addition to our complete steel fabrication and ceramic finishing line which continues to provide full service as it did prior to the present expansion.

*CHANGE-OVER POINT in straight line conveyor set-up is pointed out in this photo. Ware traveling from the flight conveyor feed onto the free-rolling 57″ wide 8-roller unit, and then onto chain which draws them into the pre-heat zone of the furnace area where they are preheated to 860° F.*

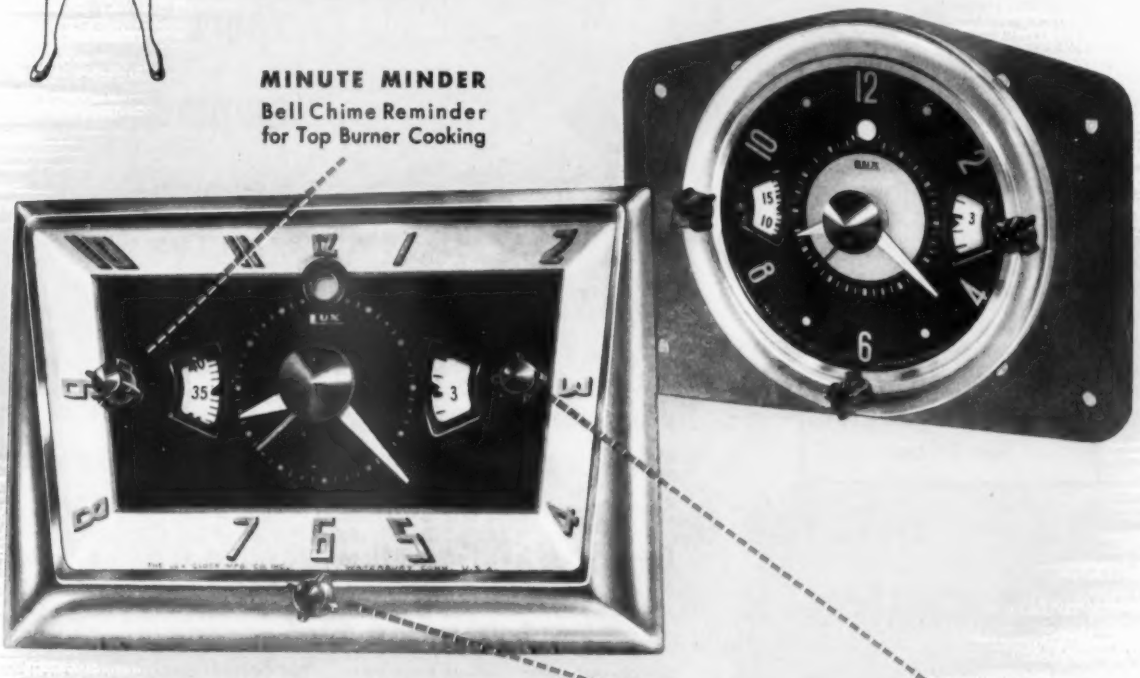
*FIRED WARE INSPECTION is carried on in a fluorescent lighted area where each part is carefully inspected as it is picked from the chain belt and stacked. Ware leaves furnace (980°) and travels some 12 feet in air, which cools piece sufficiently for it to be handled using cotton gloves.*

finishfotos

**SHE** *doesn't need to "PUZZLE OUT" a*

# LUX FULLY AUTOMATIC RANGE TIMER

**MINUTE MINDER**
Bell Chime Reminder
for Top Burner Cooking



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Big sales impact the new LUX Range Timer will add to your ranges is *simplicity*. There's no need for a housewife to "puzzle out" diagrams, struggle with instruction manuals, call in service men. She just sets bottom "time-to-start" knob and righthand "hours-to-cook" knob. Oven starts and stops automatically.

1 Time-to-start

2 Hours-to-cook

PLUS

- Exclusive one knob "cook-now" timing.
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- New Synchronous Motor Requiring No Lubrication.
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*Write, wire or phone for full specifications and a LUX Timer to test in your own lab.*

DEPARTMENT F

**THE LUX CLOCK MFG. CO., INC.**

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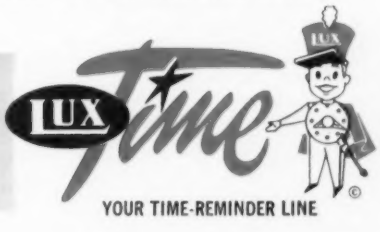

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# A realistic look at appliance service

**importance of customer needs *after* the appliance purchase stressed as author explains Maytag's program and suggests procedures for other manufacturers**

*by S. R. Payne* • GENERAL SERVICE MANAGER, THE MAYTAG COMPANY

Exclusive feature finish

The American homemaker of today is the most sought after, catered to, and sympathized with customer in the world. She is courted, coddled, interviewed and entertained, consulted and complimented by architects, designers, builders, painters, merchants, bankers, manufacturers and yes — husbands too. The appliance manufacturers probably lead the pack in this mad frenzy to please her every whim.

Appliance manufacturers, distributors and dealers are spending staggering sums of advertising money — all aimed at convincing Mrs. America that their certain brand appliance will make her household tasks simple, convenient and pleasant.

Well, Mrs. America has just so much buying resistance and, finally, for one or more of a hundred different reasons she decides on a certain brand and the sale is completed. *Or is it?* In most cases this new kitchen marvel is everything she dreamed it would be, but not infrequently, the joy and pride of owning this gleaming new masterpiece is shattered or badly shaken before she has even had an opportunity to use it.

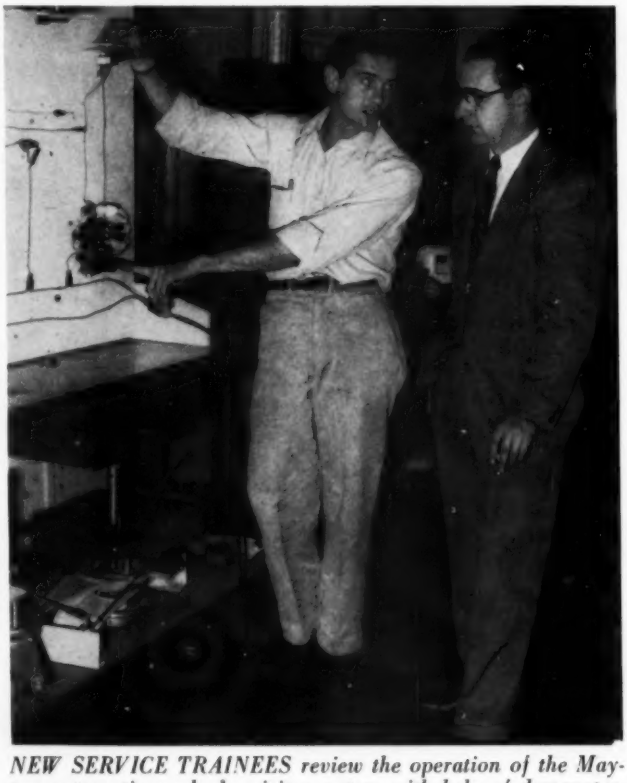
### That "after-the-sale" forgetfulness

All too often and for some reason she can't quite understand, all these people who had been falling over each other trying to please her have abruptly and mysteriously *lost interest.*

S. R. Payne
*"Let's keep Mrs. America happy . . ."*

Where *are* all of these people who were so interested in freeing her of her back breaking, time consuming household chores? What became of that man who was going to return and hook up this appliance? Why didn't someone tell her that there would be an additional installation cost?

Who is going to take care of the ugly scratch on her kitchen linoleum that appeared after the machine had been delivered? This gadget doesn't look nearly as simple here in her kitchen as it did on the dealer's floor — where is the fellow who was going to show her how to use it? Has this sale been completed? Hardly! It could have been a different story.



*NEW SERVICE TRAINEES review the operation of the Maytag automatic washer's wiring system with help of demonstration board in instruction room. This typical mock-up of washer parts is a device to give thorough service training.*

### "Expert service" problem

Or perhaps it went like this. Everything was fine until about 30 months after it had been purchased. During that time this family moves to a strange city and one busy morning the pesky thing won't turn a gear, light a light, or make a sound. No problem, you say. Of course not, Mrs. Homemaker is no dummy, she turns to the yellow pages of her phone directory and picks out the closest service agency whose bold ad reveals that they are expert at service on all makes. One of two things can happen. Her problem can be handled courteously, promptly, efficiently and at reasonable cost; or, what started as a simple service problem can turn into a series of frustrating, discouraging and costly events that transform her from a booster to a completely dissatisfied owner; sworn and dedicated to the democratic right of telling everyone who will listen what a lousy appliance she owns. Couldn't this have been avoided by adequate service?

### The "do-it-myself" group

Of course there is another type of dissatisfied customer who needs help but she won't get it from a serviceman, no matter how good he is. She has her own ideas as to how to use this new appliance. No young whipstitch of a salesman or serviceman could tell her how to use this machine! Read the instruction book? Don't be ridiculous, she has forgotten more than those people who wrote the book would ever know.

And this lady breaks all the rules, makes no effort to follow instructions and slowly but surely proceeds to reduce her beautiful new appliance to a piece of junk in comparatively few years. She then proceeds to unleash her wrath on appliance, husband, dealer, distributor and manufacturer — and in that order.

These are not rare or exaggerated examples. There are hundreds of other similar circumstances growing out of unhappy experiences with our modern day automatic household wonders. And there isn't a single person even remotely connected with the appliance industry who can honestly claim total innocence in contributing to this growing problem. It's about time everyone started thinking as much about how to *hold* Mrs. America as a customer as we have about *winning* her as a customer.

There is no magic formula for keeping her happy with her appliance any more than there was in selling it to her in the first place. To do so requires the continuing interest, understanding and cooperation of manufacturers, dealers' servicemen, consumer publications and educational institutions as well as the homemaker herself. Here are a few things that we can all do to bring us closer to solving this perplexing problem that faces us all.

### THE MANUFACTURER

1. The *quality* of workmanship and material in an appliance should be the prime consideration. At The Maytag Company, lasting quality has always taken precedence over cost, styling and so-called "features." Fortunately, with modern day engineering and manufacturing skills, these other important ingredients need not be sacrificed for quality. We would rather make the best than the cheapest.

2. Appliance manufacturers must place greater emphasis on adequate customer service. We must never lose sight of the consumers' needs *after* they have purchased the appliance. The Service Division at The Maytag Company has always considered this their primary responsibility, and we constantly strive to improve consumer service through closer service contact with our dealers, more and better service training schools for dealers and by constantly reminding dealers that satisfied users are their most powerful advertising medium.

3. Manufacturers must again be more selective when choosing dealers to sell their appliance. Many dealers make little pretense of offering service — their only selling point is "price." The Maytag Company has always felt that a well trained and equipped service department, or in lieu of that, a required service agreement with a reliable central service firm, should be a requisite for holding a franchise to sell the appliance.

4. The need for closer cooperation with educational institutions is apparent. The teaching of modern homemaking techniques along with adequate training in the use of household appli-

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ances must start in our schools. Most educational institutions are receptive to such a program but they need the help and guidance of the appliance manufacturer. Under the direction of our Home Service and Field Education Departments, The Maytag Company makes appliances available to many high schools and colleges at reduced prices and follows up with instructions.

*"In one tested area, it was discovered that 37% of the instruction books were washed with the first washing. . "*
THE EDITORS

## CONSUMER MAGAZINES

1. Magazine and newspaper home service departments exercise considerable influence over the homemaker and are rendering a valuable service to both consumers and manufacturers by providing the homemaker with more frequent articles on how to choose and use her appliance. More can be done.

The American Home Laundry Manufacturers' Association has an annual national conference dedicated entirely to describing latest homemaking techniques to magazine and newspaper home service directors, high school and college home economists, agriculture extension workers, etc. The Maytag Company actively participates in AHLMA activities along with other manufacturers in promoting new and better laundry techniques, higher quality appliances and stimulating greater understanding and cooperation between manufacturers, dealers, publications, educational institutions and the consumer. More active participation on the part of these groups is desirable.

2. Each year millions of young women graduate from high school or college and choose what is by all odds the most popular feminine career of all — homemaker. Great strides have been taken in preparing young women for their homemaking tasks but greater emphasis must be placed on teaching these youngsters how to care for and use their major household appliances. They should receive training on the basic construction of the appliance so they can better understand and appreciate how, why and what it does for them.

They must be taught, if you please, the limitations as well as the many advantages offered by our modern automatic appliances. Young homemakers should learn how to choose an appliance, what kind of a dealer she should buy from, and last but not least, what to do and expect when the appliance breaks down. Manufacturers and many dealers are anxious to offer their assistance in such courses of instructions.

*SERVICE ORGANIZATION is broken down into territories to provide for greater coordinated efforts in the field. Here, two regional managers look over new assignment while at Maytag taking a refresher training course in proper service procedures.*

## APPLIANCE SERVICE

There is a world of difference between an appliance mechanic and an appliance serviceman. A serviceman must be more than a good mechanic. He must also be a diplomat, a public relations expert and a good listener. It has always been my contention that the formula for successfully handling a service complaint amounts to about 25% repair and 75% customer relations work. Correcting the mechanical failure often proves to be the simplest part of the job. Here are a few things that The Maytag Company has always advocated as essential when handling customer service.

1. COURTESY — The most irate housewife will nearly always react favorably to sympathetic, courteous treatment. It takes no more effort, no more time and costs no more to be courteous than to be abrupt, disinterested or rude. It takes only a fraction of a second to say "Please" or "Thank you." It is easier to smile than to frown. You never win an argument with a customer. If a customer is entitled to nothing else, they are at least entitled to courtesy.

2. *DEPENDABILITY* — A broken promise is the basic cause of a majority of consumer complaints. *Never* make a promise that you don't intend to keep. A minor complaint often grows to major proportions as a result of failing to make the repairs on a promised date or at a promised charge.

3. *NEATNESS* — A serviceman or a service shop doesn't have to look like the inside of a grease barrel. Neatness denotes efficiency. This applies to both the person and the manner in which he works.

4. *PRODUCT KNOWLEDGE* — It might seem superfluous to point out that knowledge of the appliance and the correct repair procedures is absolutely imperative. Yet, the absence of this knowledge is without doubt the greatest single cause of consumer dissatisfaction. Granted there will be times when the solution to a service problem is baffling even to the best trained man but such instances should be the rare exception rather than the general rule. There is no excuse for incompetence and the consumer cannot be expected to tolerate it.

5. *RESELLING* the consumer on her appliance is just as important as correcting the mechanical failure; sometimes more important. Human nature being what it is, we all take pride in our possessions. When an appliance we have bought suddenly fails, it immediately causes us to question our judgment in having chosen that particular appliance. Our confidence in it is shaken and we wonder if it will ever be the same again. A housewife who has had trouble with an appliance needs more than a correction of the mechanical failure, she needs to be "re-sold." An appliance is made up of many individual parts and the fail-

ure of one part or assembly doesn't contaminate the rest. Tell her she has a good appliance; point out its good features or in other words reassure Mrs. Homemaker that she didn't make a mistake in buying it and now that the failure has been corrected it will continue to serve her well.

## THE CONSUMER

Here are a few things for the consumer to consider before and after she buys an appliance.

1. A prospective appliance buyer when choosing a dealer from whom to buy should be cognizant of the cost of maintaining a well-trained, well-equipped service department. The good servicing dealer or one who pays a central service firm to handle it for him obviously incurs a greater overhead than a dealer who makes no provision for handling service. This may be reflected in the selling price of the appliance. Question the dealer carefully about the service he has to offer, then ask for references. Talk to others who have purchased from him in the past.

2. When out of warranty service is required and the selling dealer or service firm is not available or known, a franchised dealer, a product distributor or manufacturer's representative will gladly recommend a reliable firm.

3. A consumer has every right to ask questions about service work performed and the charges made. Repair costs should be itemized. Make certain factory recommended prices are used on parts and assemblies.

SERVICE
THE MAYTAG COMPANY NEWTON, IOWA
Which spline is the phony?
YOU CAN TELL THE ORIGINAL BY THE SCRIPT
Performance of Maytag parts builds customer satisfaction- Your most important asset!

*SERVICE PUBLICATION issued monthly provides service tips, information on product changes, repair parts, price changes and special important news of interest (see item above.)*

*IOWA SCHOOLS are showing interest in teaching servicing and repair of home appliances in adult and vocational education night classes. Three educators of Iowa recently sat in on one of the monthly sessions held at the Maytag company for Maytag dealer representatives. Watching (l to r) are Lee Stoddard, Maytag supervisor, field service and training; A. B. Musselman, coordinator of trades and industry; John Bell, director of industrial education, Des Moines, Iowa, schools; and O. H. Beaty, state supervisor, trade and industrial education.*

4. When an appliance needs repair, question the need for removing it from the home to perform the repair work. In some cases this will be necessary but most repairs can be made without removing the appliance. Considerable labor cost may be saved by permitting the repairs to be made in the home.

5. Modern household appliances perform automatically tasks that used to be done manually. They do this through the use of motors, switches, solenoids, timers, valves, thermostats, tubes and other intricate devices that were not present on *yesterday's* appliances. They are truly wonderful, remarkable mechanisms and reliable manufacturers take great pains to make them the very best they know how. Just as they do more for the housewife, there are more things which may cause it to fail.

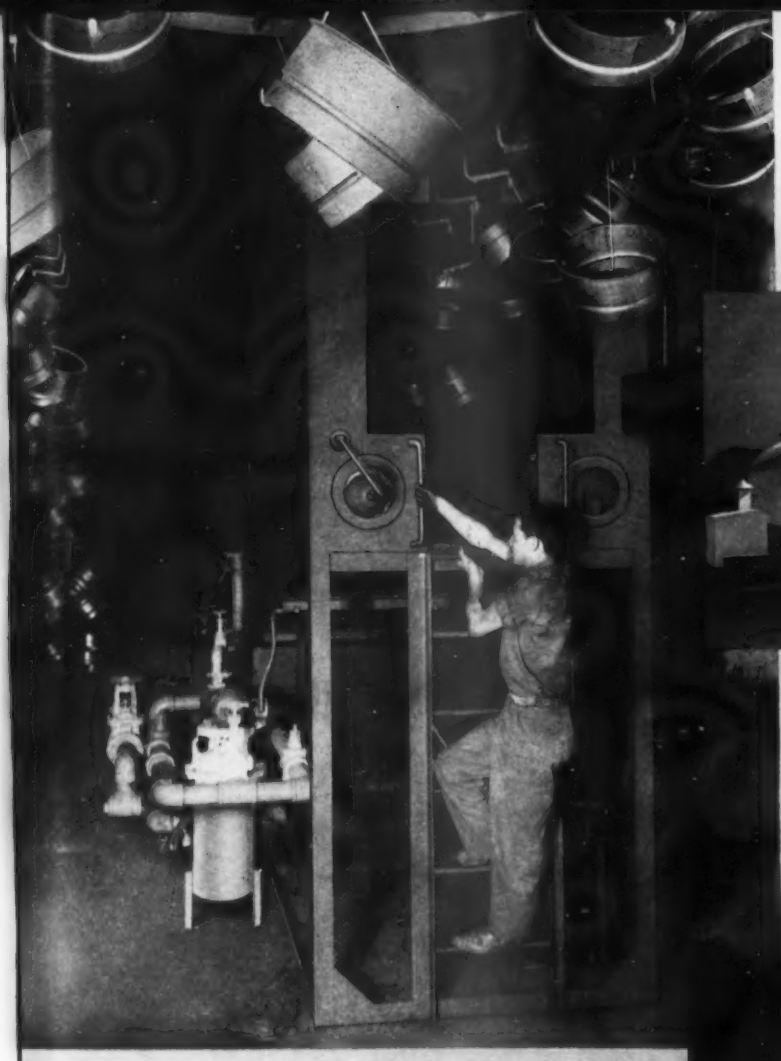
6. Appliances are designed and manufactured by experts. Users instruction books and maintenance manuals are carefully prepared at considerable cost. They are provided to the user free of charge to help her receive the greatest benefit from her appliance. Many problems experienced by housewives could have been avoided or corrected simply by following instructions. An appliance is to be used; not abused, enjoyed; not destroyed.

Through its nearly 50 years experience in the appliance industry, The Maytag Company has established itself as a leader in promoting good customer service. Twenty-five expertly trained service technicians travel the nation working closely with retail dealers conducting service schools and keeping them posted on improvements and new techniques.

Genuine repair parts, manufactured to rigid factory specifications are available for appliances manufactured over *30 years* ago and complete stocks of these parts are available from dozens of distribution points throughout the country. From President Fred Maytag II on down you will find not just a passive interest but a sincere concern for the consumer who has purchased a Maytag.

We know that good appliance service *is* possible and millions of housewives have never experienced the unpleasant problems discussed in this article. Those unfortunate appliance owners are in the small minority but everyone associated with the appliance industry must make a concerted effort to make this minority even smaller.

Appliances will come to do more for Mrs. America. The next ten years will see revelations in home appliances that the average housewife hasn't even dreamed of. But they will become more complicated too and everyone concerned with appliance service must work conscientiously to meet the problems that will inevitably result. Let's keep Mrs. America happy with her purchases and she will come back for more.



New Cincinnati Flo-coater automatically paints fan parts, wheels, housings and assemblies at NuTone, Inc., Cincinnati, Ohio. Unit conserves paint formerly lost, boosts production speed.

Huge Cincinnati gas-fired baking oven at NuTone, Inc., is roof-mounted, frees valuable plant floor space for assembly and other operations. Painted parts are automatically conveyed through 15 minute baking cycle.

# SAVES $900 A WEEK

## ...new Cincinnati Finishing System at NuTone

This automatic painting and baking system, designed by CINCINNATI for NuTone, Inc., world-famous manufacturer of door chimes, ventilating fans and kitchen hoods, has increased production, sharply slashed finishing costs and doubled capacity per square foot area.

The former method used by NuTone, to spray parts and assemblies for their products, consumed large quantities of paint. With the new CINCINNATI system, paint consumption is reduced to from 35 to 50% of what was formerly required.

Add to this a substantial increase in production, and you realize the unbelieveably higher efficiency NuTone has achieved, while saving more than $900 per week!

Take a look at your finishing costs. Better yet, have a CINCINNATI Cleaning and Finishing engineer take a look at them. He'll give you a no-obligation analysis that can point to real savings for you. Write today!

**OPERATION CYCLE**

1. Loading
2. Flo-coating
3. Excess paint runoff
4. Baking
5. Touch-up
6. Unloading

Conveyor speed 10 ft. per minute
Baking temperature 280°F.

*CINCINNATI designs, manufacturers and installs complete cleaning, finishing and baking systems, custom-built for your requirements.*

Cincinnati

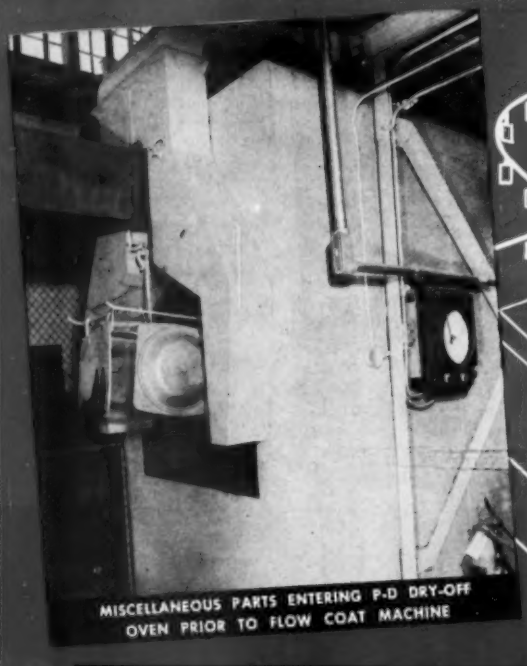
THE CINCINNATI CLEANING AND FINISHING MACHINERY COMPANY

2004 HAGEMAN STREET SHARONVILLE, OHIO, U. S. A.

# CROSSROADS OF PRODUCTION MEET IN A 60 FT. SQUARE

## 5-Stage Power Spray Phosphatizing System with Flow Coat Painting and Roof-Top Baking Ovens

## by PETERS-DALTON



MISCELLANEOUS PARTS ENTERING P-D DRY-OFF OVEN PRIOR TO FLOW COAT MACHINE

MISCELLANEOUS PARTS ENTERING P-D 5-STAGE PHOSPHATIZING MACHINE

Here in this divisional plant of a major appliance manufacturer, a carefully chosen location with economy of space for finishing operations was most necessary. Although the building has a huge one floor area, the many fabricating and assembling operations are space consuming. To co-ordinate these phases with finishing operations required detailed study and design by Peters-Dalton engineers. Results: A Complete Set-Up — 5-Stage Power Spray Phosphatizing System, Flow Coat Painting, and Roof-Top Baking Ovens—all installed in an area 60' x 60' square. Conveyor units carry parts of various sizes through these operations continuously and deliver them completely finished to the final assembly stations.

These compact, efficient units — designed, fabricated and installed by Peters-Dalton — include a 5-Stage Power Spray Phosphatizing System with: Stage 1, Wash at 180° — Stage 2, Rinse at 180° — Stage 3, Phosphatizing at 160° to 180° — Stage 4, Cold Rinse — Stage 5, Chromic Acid Rinse at 140° — temperatures are maintained with gas fired P-D vertical heaters. The low pressure Flow Coat Painting is at 100 g.p.m., with viscosity control and solvent flush system. The Roof-Top Baking Ovens are heated by direct fired gas heaters with set cycles; dry-off of 300° for 4 minutes; prime bake at 450° for 15 minutes; white enamel at 400° for 30 minutes. The system handles miscellaneous metal parts at conveyor speeds of 6 ft. per minute, with a weight capacity of 9M lbs. per hour. As in all Peters-Dalton installations, pumps of adequate capacity, correctly sized piping and spray nozzles, drain separations, exhaust ventilation, etc. etc., have been most carefully engineered and installed to meet all requirements.

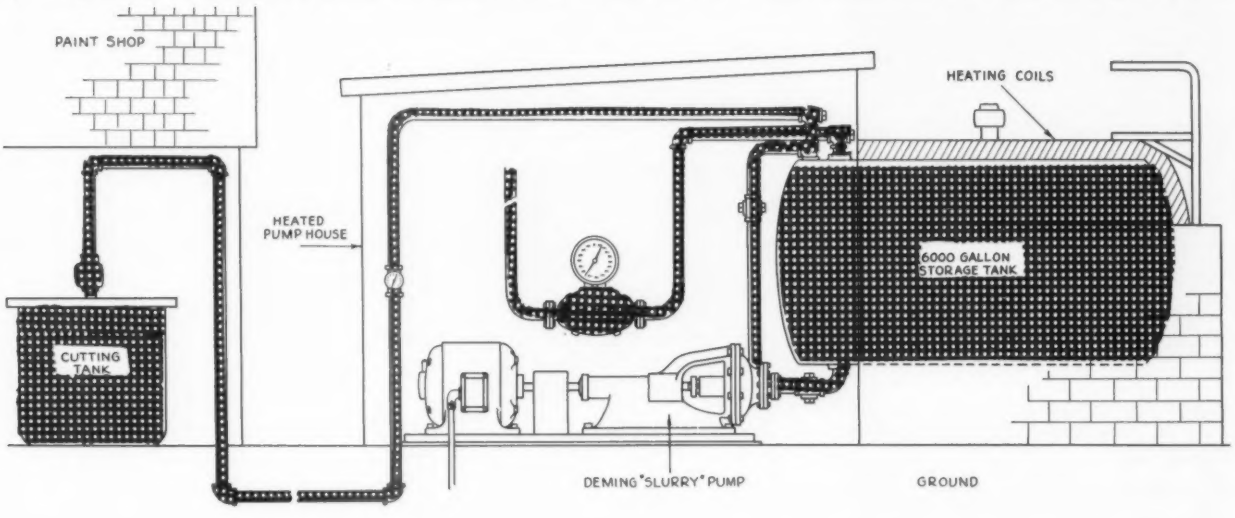
Whether your needs are for small or large equipment, depend with confidence upon Peters-Dalton. Just write, wire or phone — we'll be glad to tell you more.

**Representatives in principal cities.**

- *Hydro-Whirl Paint Spray Booths*
- *Industrial Washing Equipment*
- *Drying and Baking Ovens*
- *Hydro-Whirl Dust Collecting Systems*

PD Peters-Dalton INC.
A SUBSIDIARY OF DETROIT HARVESTER CO.
17890 Ryan Road • Detroit 12, Michigan

# Simple engineering greatly improves paint storage system




### good application of available equipment results in increased efficiency for metal furniture mfr.

A COMBINATION of good pump applications, electric coils and outdoor storage is cutting costs and eliminating production delays in the application of bulk paint at the General Fireproofing Co., Youngstown, Ohio.

A large manufacturer of metal furniture, the company faced an increasing problem of storing large quantities of unmixed grey paint and keeping it available for immediate use in finishing departments on its fast-moving production lines. Some departments are as much as a mile from the storage area.

The best storage place was outdoors where deliveries could be made easily in 3,000 gallon amounts directly from tank trucks. Temperatures, however, created bottlenecks. In winter the paint was too thick, and in spring and summer daily temperature variations delayed and complicated thinning operations. Inside storage was impractical because of space limitations.

Howard Burt, plant engineer, installed an outdoor tank and equipped it with a self-agitating pump system. The 6,000 gallon tank is located at the end of the paint shop. Electric heat coils were wound around the tank to keep the paint warm and fluid in storage. Six inches of insulation cover the sides and one end of the tank. The open end is housed in the heated pump house.

Burt next installed a rugged slurry pump to handle the thick, heavy, unmixed paint. The pump was designed originally to pump Portland cement. It delivers the warm paint from the tank to the paint shop for thinning.

To prevent settling and hardening of the stored paint, Burt installed a continuous line from the pump's discharge to the top of the tank. The result is continuous recirculation with the pump in action at almost all times. A pressure valve in the line cuts off the recirculating system when the line to the paint shop is open. A pressure gauge measures the volume of paint remaining in the tank.

Inside the shop eight other pumps deliver many colors and types of thinned paint to finishing departments all over the plant.

Burt cites the job as "not unusual, but a good application of available, rugged equipment."

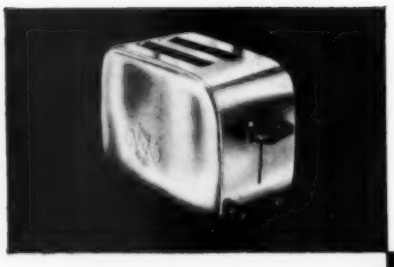
**HUYCK** *FURNISHES FIREBRICK MASONRY TO BUILD, REBUILD AND REPAIR ALL TYPES OF: ENAMELING FURNACES . . . FRIT SMELTERS . . . ALUMINUM, BRASS, LEAD SMELTERS . . . FORGE FURNACES . . . HEAT TREATING FURNACES.*

**HUYCK** *LINES AND RELINES MILLS*

**HUYCK** *MASONRY IS GUARANTEED TO GIVE YOU BETTER PERFORMANCE AND LONGER LIFE*

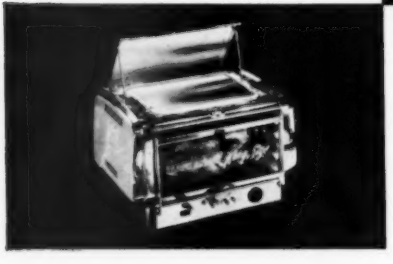
**Huyck CONSTRUCTION COMPANY..**

**1861 DeCook Avenue • Park Ridge, Illinois**



**Capitol Products Co., Winsted, Conn.** — Triple plated (copper-nickel-chrome) steel toaster shell eliminates costly and dangerous hand buffing. Result: increased production, fewer rejects.

**Century Enterprises, Inc., New York City** — Fryer wrap-around of copper steel reduces scrap factor, eliminates post-plating. Result: increased production, lower cost, fewer rejects.



**Marlun Manufacturing Co., Woodside, Long Island** — Chrome steel rotisserie shell eliminates post-plating operation — saves 20% in production costs.

# HOW MANY REJECTS CAN YOU AFFORD?

If you're plagued by a high scrap factor due to post-plating, buffing and excessive handling of plated metal components, check the advantages of pre-plated Nickeloid Metals. These modern *finished* raw materials have brought new methods of production to the appliance industry in a wide range of cost-saving applications: toaster shells, rotisserie bodies, fryer wrap-arounds, hot plates, heating element covers and decorative trim.

Nickeloid Metals help reduce rejects because they *eliminate three production steps*—plating, cleaning, buffing; *minimize handling operations*—the plated part moves from fabrication right into assembly; and the metal, itself, is *durably, uniformly pre-plated.*

Remember, too, that in most cases Nickeloid Metals fit right into standard production techniques—require no extensive re-tooling or special handling. For severe forming operations use Nickeloid Metals protected with Mar-Not, a protective coating that peels off.

CHROME, NICKEL, COPPER OR BRASS FINISHES ON BASE METALS OF STEEL, ZINC, COPPER, BRASS AND ALUMINUM. SHEETS, COILS AND STRIPS.

*More Than a Metal — It's a Method!*

NICKELOID METALS SINCE 1898

**Send for Free Sampler-Selector**

Handy slide-chart gives specifications, finishes and typical uses for Nickeloid Metals. Contains 8 metal samples.

**AMERICAN NICKELOID COMPANY**
**Peru 11, Illinois**


**SMALL PARTS** CONTINUED

prior to plating; the remaining 1 per cent that enters the polishing room after plating consists of chrome plated parts which require a color-off finish.

After polishing, the parts are degreased again and are then ready for plating. Plate thicknesses vary with the different metals. Bronze is plated to about .0001-in.; nickel to about .00035-in.; and cadmium on steel to about .00035 in. Chrome is applied in the usual very thin decorative coating thicknesses.

### Clear enamel protects plated parts

Many of the plated products would tarnish quickly when exposed to air or would become tarnished from handling. These parts and products are given a coating of clear baked enamel after plating. This enamel is hardly visible to the eye, yet it will preserve the luster and brightness of the plated coating.

A small paint booth is available for application of the enamel. Paint guns of all sizes are available, even the very small paint gun developed by the artist, Petty, for painting his famous "Petty Girls". After enameling, the parts go into small horizontal infra-red ovens where the clear enamel is baked at 475 degrees F. Coated aluminum parts require about 3 minutes of baking at this temperature; coated copper parts require up to 9 minutes of baking.

A great deal of masking work is required during enameling. This is facilitated by using pre-cut, punch out masks. These pre-cut masks greatly speed masking work, and more than amortize the extra cost.

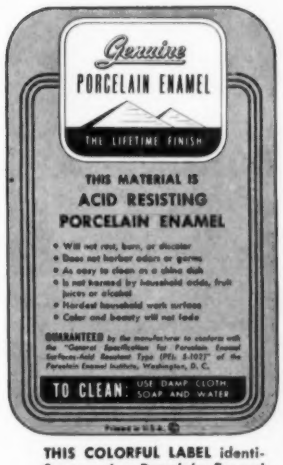
It would be impossible in any article of this length to point out and describe in detail the many variations of finishing techniques employed to obtain the almost numberless varieties of finishes employed, for instance, the hand finishing necessary to obtain a statuary bronze or aged brass effect. Suffice it to say that these are oxidizing operations requiring a great deal of operator experience and know-how. Operator experience plays a large part in obtaining most of the specialized finishes. He must visually calculate the results as treatment progresses and must know when to continue and when to stop.

So, we repeat, for small hardware parts the machine shop production of the part or product is relatively simple. But the part must be finished. And therein lies tremendous complexity and a substantial part of the cost of the product.

# The POPULARITY of Porcelain Enamel *makes your selling EASIER!*

The customer-demand for greater beauty and longer life of appliances leads progressive manufacturers to expand their use of Porcelain Enamel. This superb finish is popular because housewives know from experience that it remains new-looking for years, with a minimum of care and attention. Successful appliance manufacturers are capitalizing on the proven sales appeal of Porcelain Enamel by using this finish on refrigerators, ranges, washers, dryers, freezers and many other products.

Use the proven popularity of Porcelain Enamel to gain customer demand for your products!




**THIS COLORFUL LABEL** identifies genuine Porcelain Enamel Surfaces on appliances and other products. Put it on your products, so that customers will recognize it as identifying a finish of highest quality.

***Do you have the P. E. I. label folder SALES HELP? If not, use this coupon:***

*This message sponsored by the Frit Division of the*

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Associations Building, 1145 Nineteenth St., N.W. Washington 6, D.C.

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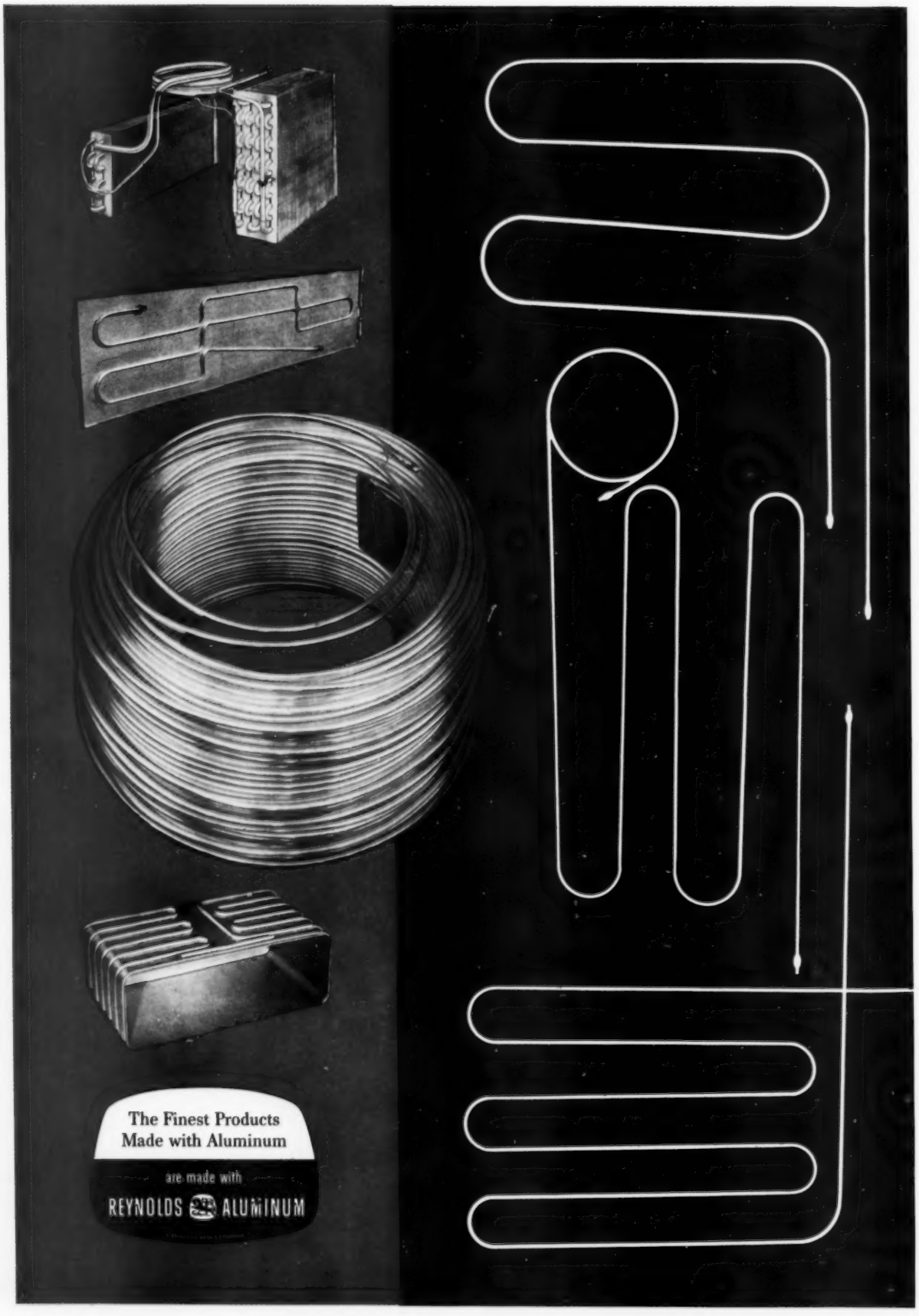

The Finest Products
Made with Aluminum
are made with
REYNOLDS ALUMINUM

## For Refrigerators, Freezers, Air Conditioners . . .

# Choose ALUMINUM

## VACUUM SEALED

# REFRIGERATION TUBING

# from REYNOLDS

Reynolds Aluminum vacuum sealed refrigeration tubing easily meets the most rigid industry standards for cleanliness and for freedom from moisture.

To facilitate your production and eliminate waste, you can order Reynolds Aluminum extruded vacuum sealed refrigeration tubing in coils, or formed to your specifications and with or without copper connections welded to the ends. Reynolds Aluminum refrigeration tubing is available in a wide range of wall thicknesses and tubing diameters.

The high quality and economy of this aluminum refrigeration tubing stems from Reynolds wide experience as one of the nation's leading producers of refrigeration and other appliance parts. This experience —plus Reynolds tremendous fabricating facilities—assures production of aluminum refrigeration tubing that meets the most exacting industry requirements.

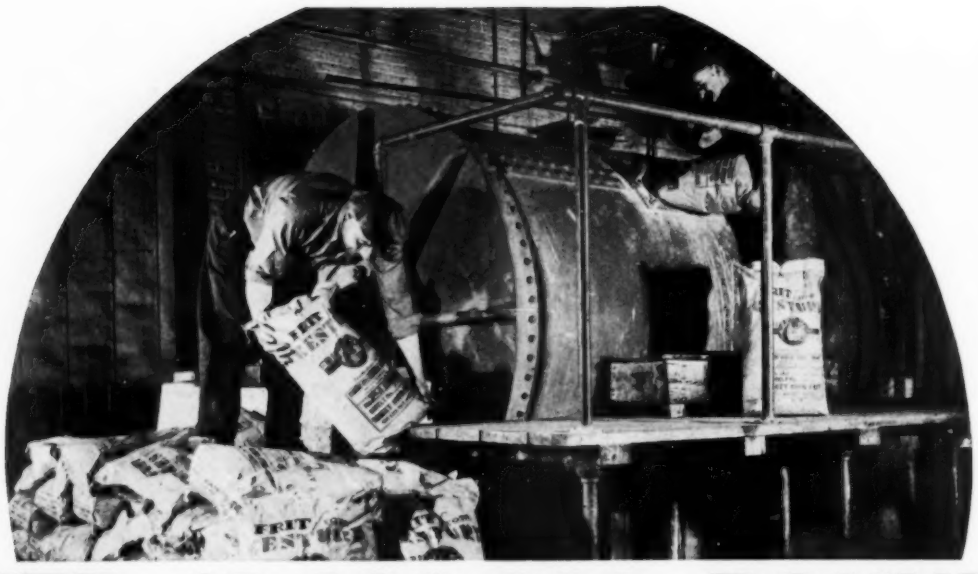
For details on vacuum sealed aluminum refrigeration tubing—and for information on Reynolds vast fabricating and newly expanded finishing facilities—contact your nearest Reynolds Office or write *Reynolds Aluminum Fabricating Service, 2058 South Ninth Street, Louisville 1, Kentucky.*

Write for your free copy of 20-page brochure,"Aluminum Appliance Parts".

*Watch for Reynolds New Program, "Circus Boy", Sundays on NBC-TV*

# REYNOLDS ALUMINUM FABRICATING SERVICE

**BLANKING • EMBOSSING • STAMPING • DRAWING • RIVETING • FORMING**
**BRAZING • ROLL SHAPING • TUBE BENDING • WELDING • FINISHING**



# OVER 18,000,000 POUNDS

Over 18,000,000 pounds of Century ground coat frits have been prepared for application in this one mill by one of the country's leading manufacturers of fine gas ranges.

Century porcelain enamel frits are ground, 6,600 pounds at a time, for producing trouble free ground coat finishes.

Century *time-proved* ground coat frits "stay put", whether the finish is for ranges or *any* modern fabricated sheet steel product.

Specify Century *time-proved* ground coat *and* cover coat, for the finest product finish.

★ *Century produces a complete line of ground coat and covercoat enamels for all types of production porcelain enameling.*

**FRIT from CENTURY FRIT MASTERS**

## CENTURY VITREOUS ENAMEL COMPANY

• 6641-61 S. Narragansett Ave., Chicago 38, Ill. •

# Westinghouse's new plastic refrigerator

A REVOLUTIONARY new refrigerator, made of light weight plastic and metals that can be cut to any size or shape, was announced today by Westinghouse. Inside and out the new refrigerator can be custom decorated simply and inexpensively to match any kitchen styling scheme.

### Already under test

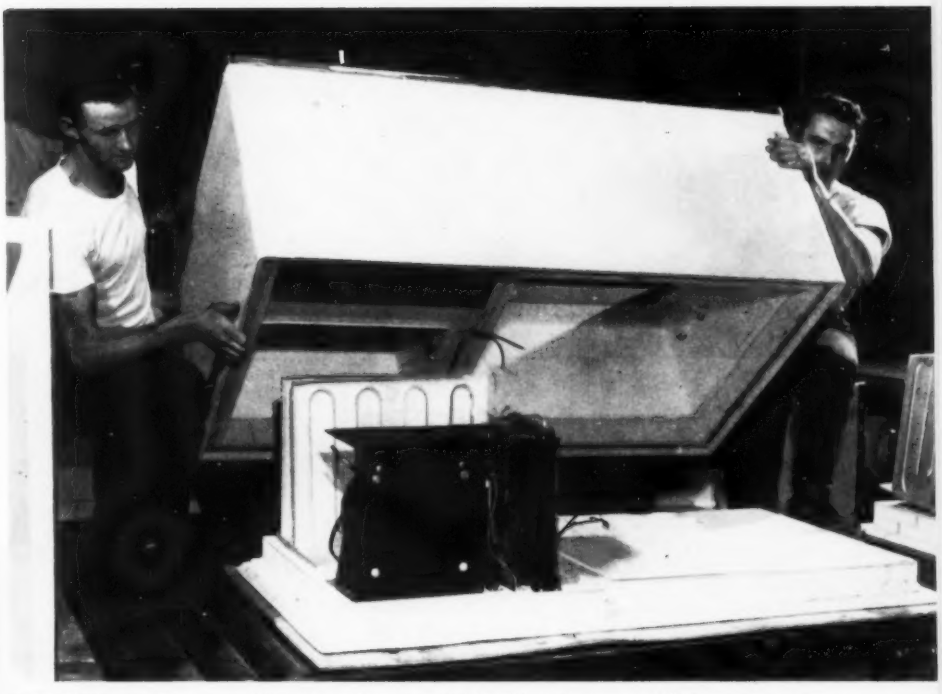
Built-in versions, using all-plastic bodies with steel doors, are already on test in more than 800 American homes. Additional pilot production of similar models is now under way at the company's refrigerator manufacturing plant.

Secret of the new technique is a one-piece, laminated three-layer "sandwich". The exterior layer or skin can be of almost any light weight metal or sturdy plastic substance. The inside skin or layer is of either polystyrene sheet or aluminum. The "sandwich" filler is two and a half inches of polystyrene foam insulation.

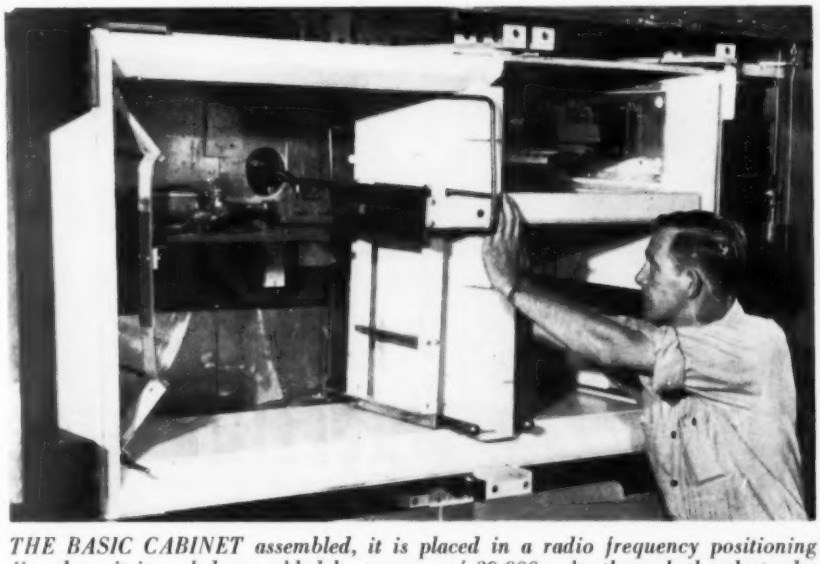
*INSTALLATION of basic refrigerating units is done here as back sheet moves along line.*

### Lower material costs

While the sandwich itself is more expensive today than traditional steel and glass fiber insulation, refrigerators made with it cost about the same as traditionally-made models. Westinghouse engineers explain that roughly 50 per cent of the cost of the new refrigerators is in materials compared to 35 to 40 per cent in conventional models. The new model, however, has relatively no tooling cost since its basic panels, which are at once exterior and interior of the refrigerator, can be cut to any size and shape with an electric saw.

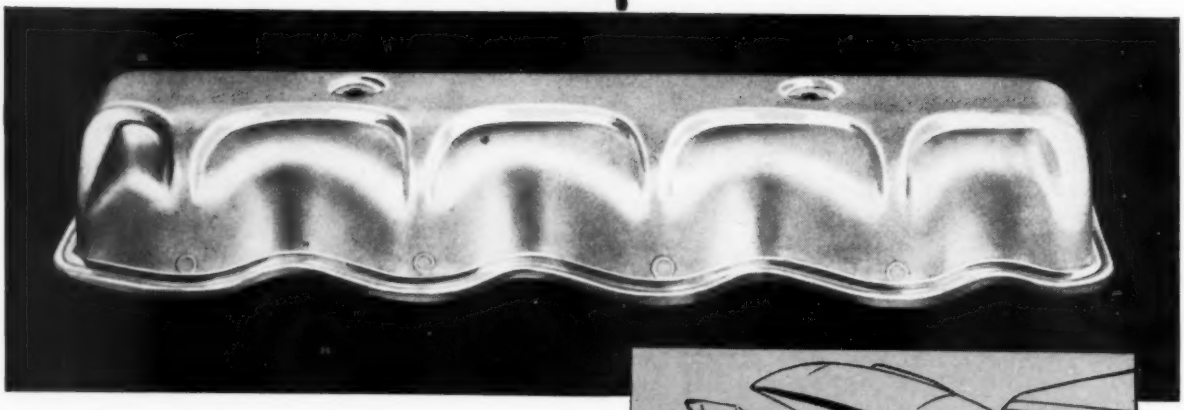


*CABINET earlier assembled in a "carton folding" technique which uses a one piece panel, mitred, to form the exterior, is placed on sheet which earlier had been affixed with the basic refrigerator units as shown in left photo.*



*THE BASIC CABINET assembled, it is placed in a radio frequency positioning jig where it is sealed or welded by passage of 39,000 volts through the electrodes in the corners for about 7 seconds. This operation sets epoxy resin, the binding seal.*

# Our challenge stands—



## —anything that can be made of steel sheets can be made of

**WHEELING**

**SOFTITE®**

**GALVANIZED SHEETS**

What manufacturer *doesn't* want to cut costs and improve his product? The big question is *how!*

The manufacturer of this valve head cover, for instance, accomplished *both* objectives by using Wheeling SOFTITE Galvanized Sheets instead of conventional cold rolled sheets. Ordinary galvanized sheets were out of the question. They just couldn't take it.

Wheeling SOFTITE takes this severe stamping in stride with no flaking or peeling...and stays rust-resistant far longer.

That's because SOFTITE is the ultimate in tight coated galvanized sheets. So tight, in fact, you can use it to make anything you can make of steel sheets.

That's SOFTITE, developed and perfected by the same company that originated Cop-R-Loy, the original copper-bearing steel pipe, and DUCTILLITE, the original cold reduced tin plate. Now... SOFTITE, the tightest-coated galvanized steel sheet, another quality product of Wheeling Steel Corporation, Wheeling, West Virginia.

## IT'S WHEELING STEEL

DISTRICT SALES OFFICES: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Houston, New York, Philadelphia, St. Louis, San Francisco, Wheeling.

# What you should expect from your paint testing laboratory

## analyses of laboratory testing for the prediction of service properties of organic coatings, with discussion on some of the problems encountered

*by Francis Scofield* • NATIONAL PAINT, VARNISH AND LACQUER ASSN. WASHINGTON, D. C.

THE primary problem in the selection of laboratory methods for testing coatings is to choose methods that are reproducible on the same material in different laboratories. While this is very difficult to accomplish, reasonable success has been achieved for certain methods. Evaluating appearance and application properties is simple and ordinary shop trials are rapid and convenient. Greatest troubles come from attempts to predict durability from accelerated test methods.

### Problem of predicting durability

Predictions of durability from accelerated methods, using devices like salt-spray cabinets, accelerated weathering units, water immersion tests, etc., are difficult to interpret for the following reasons.

First, film deterioration is not a simple process but may involve numerous reactions. When we accelerate deterioration conditions by raising temperature, high intensity light, etc., it is unlikely that all the film decomposition reactions will retain the same relative importance to each other that they hold under normal field-service, exposure conditions.

Also, conditions under which a film will be used are difficult and sometimes impossible to duplicate, and so are even more difficult to accelerate, in so far as laboratory tests are concerned.

Even weather is a highly variable condition, depending on the year, the season, and location of exposure. Some fine correlations have been made between accelerated weathering machines and 45° south-Miami exposure. This, however, is no prediction of what may happen in different exposures in other climates.

Salt-spray is a much publicized test for predicting corrosion protection by paint films. The interpretation of salt-spray testing is very difficult, and the test cannot be used to compare the relative performance of different types of materials. It is essentially *a method for testing paint application,* since serious corrosion occurs rapidly if the paint film contains flaws where bare metal is exposed.

### Blistering tendency check

Humidity cabinets and immersion in deionized water provide a fairly good measure of the blistering tendency of paint films. Since blistering occurs most readily where the film adheres most poorly, these tests may indicate the efficiency of cleaning or preparing the surface for painting.

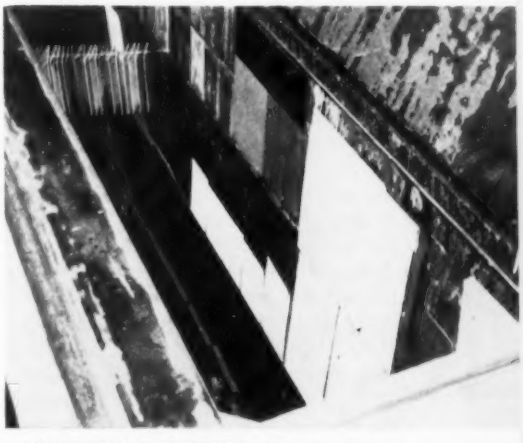
Salt water immersion is more drastic if the film is imperfect or if it fails by blistering, since salt immersion readily shows up corrosion at points of paint failure than does fresh water.

No general theory exists to explain the significance of the data of the common test methods. All such data are useful only when used together with a broad experience on field testing of coatings. Where both field and test data are correlated for particular types of finishes, then these special correlations allow for the use of accelerated data to make accurate predictions indiscriminate of minor variations in different coatings of this particular class of materials. For example, predictions can be made regarding a new alkyd resin because a background of testing and field experience has provided specific correlations for alkyd resin finishes in general. So the new item is only one minor variation of this class. However, it would be out of order, however, to attempt application of this same correlation to, say, a rubber base finish.

In general, the interpretations of accelerated testing data are restricted and limited by the extent of specific correlations that exist for special types of materials. Overlooking this limitation makes of laboratory testing methods a source of misinformation.

*SALT SPRAY CABINET is useful tool for testing paint application, but should not be used to compare relative performance of different materials.*

**The above report was prepared from notes, abstracted by E. G. Bobalek of the Case Institute of Technology during an oral presentation by the author.**



*HUMIDITY CABINETS (interior view shown) and immersion in deionized water provide a fairly good measure of the blistering tendency of paint films.*

## AMANA'S "SHARES IN AMERICA" SALES PROGRAM DRAWS INTEREST

Amana Refrigeration, Inc., instigated an 11-week program Sept. 15, inviting appliance dealers to win "shares of America" in return for outstanding sales performance with their products. The "shares" are income-producing stocks in a "blue-chip" mutual fund with each share currently valued at $12.50. National newspaper reporting of the unusual "Sales Promotion" was reported. Present indications, according to George C. Foerstner, executive vice president of Amana, point toward this "Own a Share of America" program being the most successful promotion Amana has ever carried out.

## ASTE PASSES 35,000 MEMBERSHIP MARK

With the chartering of its new Kokomo (Indiana) Chapter, No. 137, the American Society of Tool Engineers has raised its total membership to more than 35,000 tool engineers throughout the United States and Canada. The Kokomo chapter, with approximately 120 charter members, was officially inducted into the Society in a chartering ceremony in August. H. C. McMillen, national president of ASTE, was chartering officer. The Kokomo chapter is the newest of seven ASTE chapters chartered by the Society in less than six months. The 35,000 figure represents an increase of over 3,000 members in the past year.

## KANSAS APPLIANCE DEALERS PLAN SERVICEMAN TRAINING

A resolution to create a Service Men's Division and provide a method of establishing training schools in various towns of the state has been adopted by the board of the Kansas Appliance Dealers Assn. The training school set up will make it possible for factory representatives to instruct a number of groups on one trip, rather than instructing one group at a time, it was explained.

## MAN WHO AIR-CONDITIONED KANSAS CITY NAMED TO POST

James W. Riley has been elected president of the Deering Air Conditioning Co., Cincinnati, O., it was announced, following the recent board of directors meeting. He succeeds Tom Deering who resigned. Associated with Deering since February in a sales advisory capacity, Riley negotiated the recent $1,339,000 contract with developers of Arrowhead Village, Kansas City, claimed to be the largest single residential air conditioning contract ever closed.

## DAMAGED IN TRANSIT

**Articles subject to the manufacturer's excise tax are damaged or destroyed while being transported by a carrier. Title to the goods is still with the manufacturer. Who pays the tax, if any? It all depends, says the Revenue Service. Where damage is total, no tax need be paid. If the damaged wares are accepted by the consumer at a reduced price, the tax remains in effect, based on the lower price. If the carrier accepts the articles in adjustment of the shipper's claim and later sells the items, the carrier pays the tax.**

FROM THE WALL ST. JOURNAL

## GAS FURNACE SHIPMENTS UP 11 PERCENT IN JULY

July shipments of gas furnaces totaled 71,700 units, up 11 per cent from the 64,600 in the same month last year, the Gas Appliance Manufacturers Assn. announced today. Edward R. Martin, GAMA director of marketing and statistics, reported that during the first seven months of the year manufacturers shipped 428,000 gas-fired furnaces of forced warm air and gravity types. This represents a 4.7 per cent gain from 409,700 in the same period a year earlier. Shipments of gas-fired boilers for central heating totaled 6,000 units in July, down 11.8 per cent from the 6,800 of the 1955 month. On a seven months basis, the 1956 total of 43,000 is 16.8 per cent above the 36,800 in the year-earlier period. Gas conversion burners, used in changing existing heating systems from other fuels to gas, showed a sharp advance. The July total of 18,900 units shipped represented a 43.2 per cent increase over the 13,200 for the same month in 1955, and was 4,400 units ahead of June, the best previous month this year.

## ADMIRAL EXPANDS REFRIGERATOR SERVICE STORAGE FACILITIES

Construction of a new 40,000 sq. ft. building for the servicing of and storing refrigerator systems at Admiral Corp's appliance center in Galesburg, Ill., has been announced. J. R. Oberly, vice president-appliances, reported that a 180-foot long extension to the company's press room and construction of 6,500 additional feet of inter-building conveyors is under way. The new press room structure will be ready for occupancy by mid-November while the conveyor installation will be ready for use by the end of September. Admiral will have over 7½ miles of conveyors of all types in use when the additional materials handling equipment is completed.

## JULY VACUUM CLEANER SALES SET RECORD FOR 24TH MONTH

Factory sales of standard-size household vacuum cleaners in July rounded out two full years throughout which each month broke a record that had stood for periods ranging from three years to as long as the life-time of the industry, according to figures announced here today by the Vacuum Cleaner Manufacturers' Assn. January-July sales broke all records for those months, aggregating 2,171,256 units as against 2,111,169 cleaners, next highest total, in the comparison period of 1947, and topped 1,810,865 units sold in the same months of 1955 by 19.9 percent. July sales aggregated 259,774 units, an increase of 4.6 percent over 248,326 cleaners sold in the preceding month, and were 25.6 percent higher than sales of 206,758 units in July, 1955. It was the highest July since 1950, when the month's sales totaled 279,967 cleaners. March business was largest of any month in the industry's history. April and May each hit an all-time high for that month. June was highest for that month since 1950.

## CORY TO MERGE MITCHELL, FRESH'ND-AIRE FACILITIES

Production facilities of Cory Corp. divisions, Mitchell Mfg. Co. and Fresh'nd-Aire Co. are being consolidated under one roof at the Mitchell Chicago plant site, with $750,000 to $1,000,000 being spent to improve the Mitchell facilities, it was reported. An advertisement in a local newspaper disclosed that the company's plant in Grayslake, Ill., is up for sale or lease. "We are going to manufacture all of our room air conditioners and dehumidifiers in one plant," J. W. Alsdorf, president of Cory, announced. Each division will continue to operate autonomously, and there has been no change in the executive and sales personnel of either.

## GAS RANGE SHIPMENTS SHOW GAIN OVER 1955

Industry shipments of domestic gas ranges totaled 146,400 units during July, a small increase over the 1955 figure, the Gas Appliance Mfrs. Assn. has announced. The latest total compares with 146,300 ranges shipped in the same month last year. The summary by Edward R. Martin, GAMA director of marketing and statistics, shows that for seven months, the total stands at 1,157,900, down 9.5 per cent from the 1,279,200 units shipped in the corresponding 1955 period. These figures do not include built-in units, which are reported continuing to gain in both the new housing and home modernization markets. Martin's summary is based on a telegraphic survey of GAMA range division members accounting for most of the country's production. Totals thus obtained then are expanded to produce figures for the entire industry.

## ANNOUNCE PROGRAM FOR 1956 AUTOMATIC VENDORS MEETING

Plans for the completely sponsored Ladies Program at the 1956 convention-exhibit of the National Automatic Merchandising Assn., to be at the Conrad Hilton, Chicago, Dec. 2-5, have been announced by Mrs. Raymond Scheuer, Baltimore, Md., ladies activities chairman. The NAMA Ladies Hospitality Center will open at 9 a.m. Sunday, December 2, for registration. Program events for the 4 day meet include a Sunday reception and tea, courtesy of Mars, Inc.; Spanish Interlude—exciting scenes of Spain and her people, courtesy Continental Coffee Co.; "Take a Chance" party and luncheon, courtesy of National Vendors; Luncheon and Fashion show, sponsored by Reynolds Tobacco Co.; Christmas Gift-Wrapping Workshop, courtesy of Dean Milk Co. Wednesday night, Dec. 5, is reserved for the annual banquet which will feature top name entertainment sponsored by Phillip Morris, Inc.

## PERK-O-FRESH MANUFACTURING FACILITIES ARE NEW, BIGGER

The manufacturing operations of the United Coffee Corp. division that produces the "Perk-O-Fresh" Coffee Vendor (see letters to Editor page) has been moved to new headquarters at 251 East Grand Ave., Chicago, it is reported by Company Treasurer Leslie Arnett. The new facilities are more than double that which were used in their former location in Chicago. Besides the manufacturer of the automatic coffee maker-vendor, the company produces a line of cold drink vendors, as well as chocolate and tea coin machines.

## PEOPLE AND EVENTS

FRANK NUNLIST

*Frank J. Nunlist* has been appointed to the newly created position of executive vice-president of Mueller Climatrol, it was announced today by *H. P. Mueller, Sr.*, president of the Milwaukee, Wisc., heating and air conditioning firm. *H. P. Mueller, Jr.*, vice-president, has been named to succeed Nunlist as vice-president in charge of sales. Both appointments become effective immediately.

JOHN ZUBROD

*John F. Zubrod* has been appointed product manager of the air conditioning division of Whirlpool-Seeger Corp., St. Joseph, Mich., it is announced by *Lincoln M. Larkin*, air conditioning division general manager. Zubrod was associated for 23 years with the commercial refrigeration division of Servel, Inc., Evansville, Ind. which he joined in 1933 as an engineer. He was promoted to the successive positions of applications department manager, assistant to the vice president in charge of the division, and product manager.

*Clifford C. Mendler* has been elected a vice president of Sunbeam Corp., Chicago. He was previously general sales manager of the appliance division.

*Dr. Dewey J. Sandell* has been named director of research by Carrier Corp. Prior to joining Carrier in 1954, he was employed by Cambridge Corp., a Carrier subsidiary.

*Robert L. Baldwin*, distinguished chemical and metallurgical executive in the steel industry, has been appointed sales metallurgist by the Precision Steel Corp., Bridgeport, Conn., it is announced.

*Harold P. Bull* has been appointed vice president of distribution of Norge Division, Borg-Warner Corp., Chicago, *Judson S. Sayre*, president has announced. Bull will be in charge of national Norge home appliance marketing, including supervision of product and sales managers, effective immediately. An appliance industry figure for 29 years, Bull has directed operations and sales to and through Norge distributors for the past two years. *Walter C. Fisher*, field sales manager, has been promoted to the position of general sales manager, responsible for the administration of national sales programs.

# MACCO'S NEW PLANT and MODERN FACILITIES ARE MATCHED

*by a Staff of Unexcelled Craftsmen*

Modern Laboratory

Explosion-Proof Compounding Room

Scientific Testing

Starting in 1931, with a unique idea for producing specialized metal-working compounds, Macco today—25 years later—has achieved a position of unquestioned leadership in its field.

The newest and most modern manufacturing and storage facilities—a thoroughly modern and complete research, quality-control and analytical laboratory—a staff of highly trained sales engineers and skilled technicians ready to work with you in the solution of your specific metal-working problems—this is the well-rounded Macco combination that has been meeting the challenge of its customers' requirements these many years.

Macco is founded on the idea of *working for you*, producing at lowest cost metal cutting, drawing and cleaning compounds that will help you to increase production and maintain departmental harmony in your plant.

When a particularly difficult metal-working problem turns up, call for a Macco sales engineer. Let us prove to you on your own floor that Macco offers you a service that is truly hard to beat.

GEAR YOUR METAL-WORKING PROBLEMS TO MACCO

*Write today or call a Macco sales engineer*

MACCO PRODUCTS COMPANY

9210 SOUTH SANGAMON STREET • CHICAGO 20, ILLINOIS

## PEOPLE AND EVENTS
(Continued)

*Carl W. Millson, Jr.* has been named vice president, air conditioning, heating and appliance sales, Perfection Industries, Div. of Hupp Corp., Cleveland; *Donald G. Wright* was named general sales manager, contract sales, it is reported.

A new administrative Central Staff for American Air Filter Co., Louisville, Ky., has been established with *Robert W. Nelson,* vice president, as director. He is currently executive assistant to the director of sales. *John Hellstrom,* vice president and director of sales, has been named to administer the American Air Division (Louisville Operating Division) in addition to his other duties. *James W. May* has been appointed director of technical training. He will be relieved, effective November 1, 1956, of his duties as technical director of the Air Filter Products Dept.

The promotion of *C. V. Myers* to manufacturing manager of Eljer Factory Operations has been announced by *Louis Probst,* Vice President of the Murray Corp. of America, and general manager of the Eljer Division. He was formerly plant manager of the Vitreous China Division in Ford City, Penn. *A. W. Witzemann,* formerly production manager of the Vitreous China Division, succeeds Myers as plant manager.

D. R. ANNEAUX

Appointment of *Dwight R. Anneaux* to the new position of manager of special markets for Whirlpool-Seeger Corp., St. Joseph, Mich., has been announced by *Jack Sparks,* general sales manager. In his new position, Anneaux will have overall supervision of builder, utilities, and key account sales, as well as of the home service department.

MISS GLORIA A. PERRY

Appointment of *Miss Gloria A. Perry* as staff home economist in Chicago has been announced by *Mrs. Jessie Cartwright,* home service director of Norge Division, Borg-Warner Corp., Chicago.

*Robert F. Hume* has been appointed director of purchasing for Mueller Climatrol, Milwaukee heating and air conditioning manufacturer, it is announced by *F. J. Nunlist,* executive vice president. Hume, who has spent some time in practically every department of the company, has been with the firm since March 1946, when he completed Navy service.

*James J. Nelson* has joined the design staff of J. M. Little & Associates, Maumee, O., industrial designers and engineers, according to *F. M. Gustafson,* director of design of the Industrial Design Division.

*R. T. Johnstone* has been appointed to the newly created position of assistant sales manager for The Cross Co., Detroit, Mich., producer of automation machinery and special machine tools.

*Kenneth C. Kleidon* has been named to the newly-created post of National Color Television Manager for Hycon Electronics, Inc., Pasadena, Calif., it is announced. *Harry A. Kirkpatrick,* general manager, said that Kleidon's chief responsibility will be to help familiarize television manufacturers, distributors, dealers, and service organizations with new techniques and equipment developed for testing and servicing color TV receivers.

*James C. Jenkins* has been named director of industrial relations for Hussman Refrigeration, Inc., St. Louis, Mo.

Appointment of *Joseph Dodson* to the newly created post of director of company-owned operations for Culligan, Inc., of Northbrook, Ill., has been announced by *Harold F. Werhane,* president. Werhane said the new post was created "because of the company's rapid growth, anticipated doubling of sales over the next five years, an accelerated program for testing experimental projects, and the increased use of pilot projects for research purposes."

Appointment of *G. T. (Ted) Kellogg* to the position of assistant to the director of public relations of the Air-Conditioning and Refrigeration Institute has been announced by *Geo. S. Jones, Jr.,* A.R.I.'s managing director. Among his responsibilities will be the editorship of the Institute's monthly publication, "Koldfax".

M. EVERETT BARNARD

The appointment of *M. Everett Barnard* as manager of Carrier Corp's Unit Heater Department has been announced by *Loren Fletcher,* vice president and general manager of the Allied Products Division at Syracuse, New York.

*Andrew W. Hughes* has been appointed comptroller of Rheem Manufacturing Co., according to President *Richard S. Rheem.* The new comptroller is a member of the American Institute of Management, the American Ordnance Association, and the National Association of Cost Accountants.

Appointment of *Stanley Silber* as director of sales for the Lewyt Air Conditioner Corp., Long Island City, N.Y., makers of built-in-wall air conditioners, has been announced by *Irving Bottner,* vice-president. Silber joins Lewyt after serving as vice-president in charge of sales for the James Manufacturing Co., Independence, Kan., makers of built-in appliances.

# How Great Lakes Steel *launches* quality

You're at 400 feet, banking for a good close look at the unloading operation of the *Ernest T. Weir*. She's packed to the gunwales, stem to stern, with ore—tons of iron-bearing food for Great Lakes hungry blast furnaces.

What's this got to do with turning out top-quality steel at Great Lakes? Plenty! For quality pig iron can only come from quality raw materials—like the *Weir's* rich cargo. And, of course, quality pig iron is the very backbone of top-quality steel.

Control of quality at Great Lakes begins right at the mines. In fact, each ore source is picked with painstaking care. Then, repeated checks in the mines—*double checks* here at the unloading docks—put the quality of Great Lakes raw materials beyond question!

It's that kind of control (from start to finish) that gives our flat-rolled products uniform quality—assures that they will reach our customers exactly when and as ordered. We're ready to talk your steel needs whenever you are.

**GREAT LAKES STEEL CORPORATION**

Detroit 29, Michigan • A Unit of

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*District Sales Offices:* Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

TO ASSURE TOP-QUALITY OPEN-HEARTH STEEL . . . iron ore (shown stockpiled here), coal and limestone—all of known source and quality—are sampled and tested over and over again by Great Lakes Steel raw material analysts.

## ARI CHOOSES CHICAGO's HUGE AMPHITHEATRE FOR '57 SHOW

Chicago's International Amphitheatre, which last month housed the Democratic national convention, has been selected as the site for the 10th Exposition of the Air-Conditioning and Refrigeration Industry, it was announced by Geo. S. Jones, Jr., managing director of the Air-Conditioning and Refrigeration Institute, sponsor of the biennial exposition. Decision to hold the big 1957 show at the Chicago Amphitheatre followed a meeting in Chicago of ARI's Exposition Committee under the chairmanship of Rollin H. Israel of Virginia Smelting Co., West Norfolk, Va. Dates for the exposition are November 18-21, 1957.

Pointing to the growth of the air-conditioning and refrigeration industry to its present position among "the great industries of the country," Mr. Israel said that the biennial exposition of ARI have marched hand-in-hand with this growth, and now "rank among the first 10 trade shows in the country — in size, scope, and importance. The ARI expositions have truly become 'the market place of the industry," he continued. "More than 250 companies exhibited at the last exposition in Atlantic City. This list includes the leaders in the industry who have found through actual experience that in their over-all sales planning, a well-planned exhibit at an ARI exposition is one of the most effective sales tools possible for implementing their sales strategy and increasing sales. We fully expect the 1957 exposition in Chicago to surpass in size and importance all previous shows, and to reflect to the credit of the industry," Jones reported.

## NEW ALEXANDER's FEATURES PORCELAIN ENAMEL PANELS

A three-color wall of 6,000 square feet of porcelain enamel panels being installed on the second floor penthouse and entrances of the new Alexander's Department Store, White Plains, N.Y., will make the store one of the most strikingly beautiful in the United States, reports the Bettinger Corp., Waltham, Mass., who are supplying the panels. The store, scheduled for opening this fall, marks the first major use of porcelain enamel curtain walls in White Plains. The pattern will be composed of stippled yellow, salmon and sandstone panels. The panels, largest of which is 3 x 7 feet, are of two types. The first is laminate, ceramic-on-steel panels, with built-in insulation of cell-air-core, a fire resistant paper honeycomb impregnated with cement, a recent Bettinger development. These panels will set in aluminum frames. The second type is veneer porcelain-enamel fastened to metal furring which is attached to masonry. The entire job, requiring a month to complete, is being installed by General Porcelain Erectors Co. Architects for Alexanders are Ketchum, Gina & Sharp, New York City.

## LINDEMANN EXPANDS LINE; NAMES CRANSTON PRESIDENT

The election of William E. Cranston as president, and Howard N. Kyser as vice president and general manager of A. J. Lindemann & Hoverson Co., 81-year old appliance manufacturing company, has been announced. The election followed the resignation of Eugene A. Lindemann from the position of president and general manager of Lindemann & Hoverson to establish a business management consulting firm. The company is a subsidiary of Norris-Thermador Corp., Los Angeles, Calif., a major manufacturer of electrical appliances, plumbingware, cookware, automobile wheels, and compressed gas cylinders. Since acquired by Norris-Thermador in 1953, L & H has been manufacturing expanding lines of water heaters, console ranges, built-in ovens, and cooking tops in stainless and a variety of colors. The plant has just begun production of built-in refrigerator-freezer units under both the Thermador and L & H names.

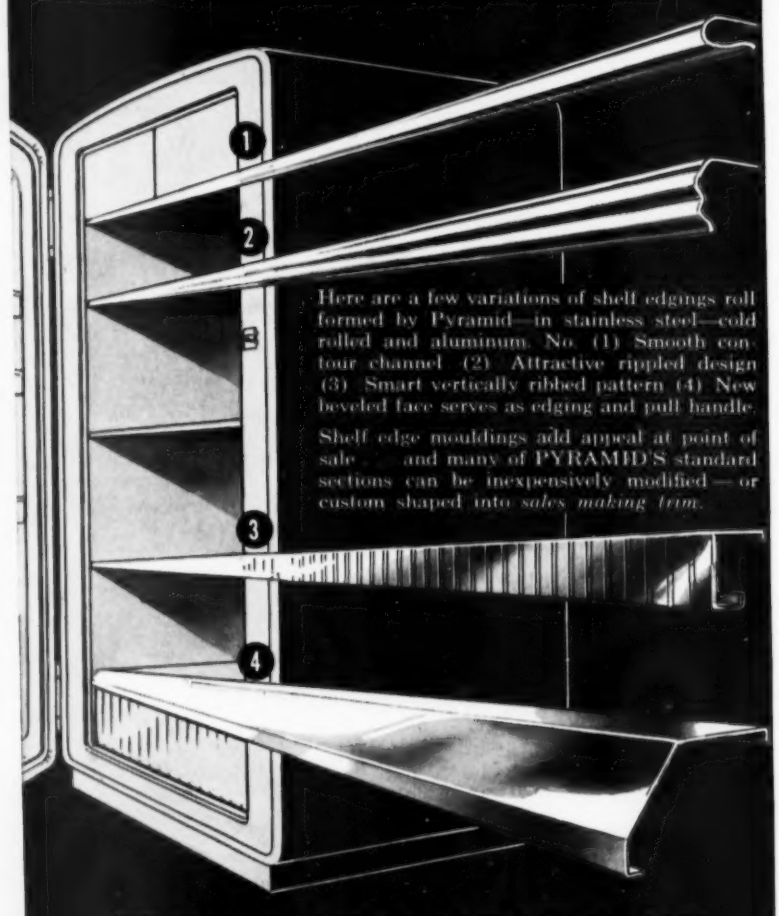
## HERBERT H. FROST DEAD; FIRST PRESIDENT OF RMA

Col. Herbert H. Frost, 63, first president of the Radio Manufacturers Assn., parent organization of the now Radio-Electronics, Television Manufacturers Assn., died Sept. 10 after a 5-month illness. Funeral services were conducted Wednesday, Sept. 12, in Fort Myer Chapel, Washington, D. C., with burial in Arlington National Cemetery. Col. Frost, organizer and co-founder of the Radio Manufacturers Assn. in 1924, was that year elected its first president. He subsequently served as president of RMA for three terms, 1924, 1925, and again in 1928. He was director of the association in 1926, 1927, 1929, 1931, and 1932. From 1938 until his death, Col. Frost was an honorary director of RMA, an honor bestowed upon him for life by the RMA board of directors.

## MAYTAG NEW PR GROUP MEETS WITH CLIENT: WAS CHOSEN IN NATIONWIDE AGENCY "CONTEST"

Maytag marketing promotional plans are studied as members of the Philip Lesly organization, which has been retained as public relations counsel for Maytag, meet with company executives. Seated, from left, are Philip Lesly, head of the public relations firm; E. F. Butler, Maytag director of public and employee relations, and Claire G. Ely, general sales manager for Maytag. Standing are W. Ken Jackson, left, vice president of Lesly and Maytag account executive, and Robert J. Hoover, Maytag's manager of public information. The new PR organization was chosen to handle Maytag's public relations after a nation wide "contest" that drew attention in newspapers across the nation.

# SELL more... SAVE more... with PYRAMID rolled shelf trim




Here are a few variations of shelf edgings roll formed by Pyramid—in stainless steel—cold rolled and aluminum. No. (1) Smooth contour channel (2) Attractive rippled design (3) Smart vertically ribbed pattern (4) New beveled face serves as edging and pull handle.

Shelf edge mouldings add appeal at point of sale . . . and many of PYRAMID'S standard sections can be inexpensively modified — or custom shaped into *sales making trim.*

Write for your free "Plan Book of Metal Mouldings", today!

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No one connected with the design or manufacture of any appliance should be without a copy of this book containing hundreds of standard and special mouldings. Send for your free copy today.

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## ADMIRAL WILL LICENSE USE OF REFRIGERATOR DOOR RELEASE

Admiral Corp., Chicago, Ill., will license other manufacturers to use its exclusive lifeguard refrigerator door release — it permits the door to be opened on the inside — J. R. Oberly, vice president, appliance division, has announced. The offer follows recent enactment by President Eisenhower of a bill requiring installation of safety door releases on all refrigerators shipped in interstate commerce. Manufacturers have two years to comply with the law. Oberly pointed out that in the past decade over 120 children have lost their lives after crawling into refrigerators, some of which had been abandoned and some of which were in use. "Admiral's 1956 refrigerators contain an inside safety release that glows in the dark," Oberly said. "Should a youngster crawl inside, and the door shut behind him, all he has to do is push the button and step out to safety."

## ARMOUR TO CONSTRUCT NEW $575,000 ADDITION

With the volume of metals research at an alltime high, and double the present available space needed to carry out projects planned by the metals department, the Armour Research Foundation of the Illinois Institute of Technology will begin construction of a $575,000 addition to its metals research building, starting in November. This is the second step in the Foundation's $5,000,000 expansion program. The first was construction of the $1,250,000 Physical and Electrical Engineering Research Building—completed earlier this year.

## UTILITY APPLIANCE CORP PLANS NEW MISSISSIPPI HEATER PLANT

Utility Appliance Corp., Los Angeles, Calif., manufacturer of air conditioning and heating appliances, has announced plans for construction of a new plant at New Albany, Miss. According to Ben B. Breslow, president of the company, the new facility will contain 150,000 square feet of work area and will be used to produce gas and electric water heaters and heating equipment. Formerly a regional producer—air conditioning appliances, forced-air furnaces, evaporative coolers, hot water heaters, and automatic gas ranges — the production of the company is also being expanded, Breslow announced, with distribution broadened to the Atlantic Coast and Canada.

LOOK TO TEMCO FOR LEADERSHIP!

LOOK TO TENNO FOR LEADERSHIP!

# RANSBURG *Electro-Spray* DOES IT BETTER... FOR LESS

Look what Ransburg Electrostatic Spray painting is doing in this eastern job shop, the Del-Val Finishers Division of J. W. Rex Company, Lansdale, Pa.

As a job shop, Del-Val handles a variety of work each month, painting hundreds of thousands of pieces and parts of various sizes and shapes.

The versatility and flexibility of Ransburg Electro-Spray makes it ideal for their varied painting requirements. Here's a typical example. Del-Val recently completed a contract for a Philadelphia manufacturer of barbecue trays with these results:

**50%** INCREASE IN PRODUCTION

**50%** SAVINGS IN LABOR and OVERHEAD

**66%** CUT IN PAINT COSTS, with improved, more uniform, and higher quality finish.

The job—flat sheet steel, 11" x 19"—enamel coated to withstand a 90 bend with sharp radius. Full coat one side; mist coat other.

| WITH RANSBURG ELECTRO-SPRAY | | BY FORMER HAND SPRAY | |
|---|---|---|---|
| Output, 375 panels per hour with 3 men | | Output, 250 panels per hour with 4 men | |
| | per panel | | per panel |
| Labor and overhead | .06 | Labor and overhead | .12 |
| Paint & lease cost | .017 | Paint cost | .044 |
| TOTAL COST | .077 | TOTAL COST | .164 |

Want to know what Ransburg Electro-Spray can do for you in YOUR finishing department? Write for our new No. 2 Process brochure. It tells the WHAT & HOW of electrostatic spray painting, and with numerous production-line examples, shows how other manufacturers are cutting finishing costs... increasing production, and improving the quality of their work with Ransburg equipment. Too, we have available now a new movie, "The Big Attraction," a 27-minute sound and color film on electrostatic spray painting.

*Ransburg* ELECTRO-COATING CORP.

Indianapolis 7, Indiana

RANSBURG

# New Supplies and Equipment

## GAS BURNER CONTROL DEVICE

New A bulletin describing a new gas temperature-regulating control for top-burner cooking now is available. The unit is equipped with a small knob set into the temperature dial. This knob permits manual adjustment of the size of the flame at the start of the cooking operation, according to the size of the utensil. The bulletin provides manufacturers of gas ranges with useful information concerning the operation of the control and its installation. Cutaway and general views of the control and details of components, with dimensions and burner clearance, are shown.

**(Check No. 900 on Service Coupon)**

## CONDENSED VALVE CATALOG

New A 32-page condensed valve catalog describes the latest designs in extensive line of 2, 3 and 4-way solenoid valves. This easy-to-read condensed catalog contains engineering information, flow charts, operation and construction details, illustrations, prices, etc. At a glance, from a unique selection chart, the reader can choose a solenoid valve to suit his requirements.

**(Check No. 901 on Service Coupon)**

## PORTABLE HUMIDITY RECORDERS

New A new bulletin describing and illustrating portable recorders for relative humidity and temperature has just been released. The six-page two-color bulletin shows samples of typical records made by the "Thermo-Humidigraph" recorders which are designed to record conditions in the room or chamber in which they are placed. Permanent mounting models are also shown.

**(Check No. 902 on Service Coupon)**

## REVOLUTIONARY GRINDING MILL

New A radically improved ball and pebble mill, said to bring a new standard of precision and efficiency in fine grinding to a broad cross-section of American industry, is described in a new bulletin. The publication covers the outstanding features: new accurate water temperature control, 20% greater jacket area plus higher water velocity for faster heat transfer than ever before, special corrosion control in water jacket, motor drive integral with mill stand, insuring perfect alignment at all times, and heavy duty anti-friction bearing assembly of exclusive design.

**(Check No. 903 on Service Coupon)**

## WELDING SOCIETY BOOK ON RESISTANCE WELDING OUT

A new source of information covering the fundamental theory, practice and use of resistance welding and titled "Resistance Welding—Theory and Use" has been published. It represents material gathered by the Resistance Welding Committee of the American Welding Society. Every aspect of the processes and their use in welding different metals for applications in every kind of industry, automotive, aircraft, railroad equipment, refrigeration, radio, television, metal parts manufacture, etc., is included.

**(Check No. 904 on Service Coupon)**

## HOW TO SUPPLEMENT MACHINE TOOLS WITH POWER TOOLS

New A new eight-page booklet illustrating and explaining the advantages of teaming standard industrial power tools with special-purpose machine tools. Ten reasons why the strategic use of power tools in a supplementary capacity can increase production, improve product quality and reduce costs are listed. Eight photo-illustrated "case histories" show results of use of power tools in metalworking plants and foundries — with savings ranging from 50 to 1,000 per cent.

**(Check No. 905 on Service Coupon)**

## AUTOMATIC HEATING CONTROLS

New A new automatic heating controls catalog is offered. Many new items include a complete line of oil, coal and electric heating controls, plus the latest in gas heating controls.

**(Check No. 906 on Service Coupon)**

## ENAMELING IRON

Full details on enameling iron is presented in this catalog which includes helpful tips on fabricating, welding, cleaning, pickling, and porcelain enameling.

**(Check No. 907 on Service Coupon)**

## MATERIAL HANDLING PUMPS

New Literature features new material handling pumps for high volume, continuous operation primarily on maintenance painting, production finishing and coating applications. Units are readily adaptable to a wider range of general purpose and high speed production needs. Efficiency and convenience of operation is said to be superior to anything previously developed. Maximum speed, economy and safety in material handling is offered.

**(Check No. 908 on Service Coupon)**

## ACID-PROOF AIR WASH SYSTEMS

New Development of a line of rubber lined, acid-proof air washers was recently announced. Designed specifically for integration into plant ventilation systems, these units are said to be capable of eliminating 90% to 99% toxic fumes and corrosives from exhaust gases. Acid-proof washers are equipped optionally with straight-through air inlet and discharge and an added downstream access hatch. Standard units are available in capacities from 7200 to 57600 C.F.M.

**(Check No. 909 on Service Coupon)**

## CATALOG ON AUTOMATION

New A new catalog just issued illustrates and describes typical applications for automatic press unloading operations. The catalog includes information on floor operations, turnover and transfer machines as well as other unloading machines used both by the mass production industries and job shops. In addition, various types of gripping jaws that suit a wide variety of unloading conditions are also illustrated and described.

**(Check No. 910 on Service Coupon)**

## MAGNETIC FORCE WELDERS

New A new six-page bulletin covering magnetic force welders points out the advantages of magnetic force welding to join difficult-to-weld critical materials and shows where light initial electrode pressure permits projection welding on materials whose projections would collapse under conventional electrode pressure.

**(Check No. 911 on Service Coupon)**

## NON-CORROSIVE NYLON

**New** A new chain with nylon wheels for materials handling applications has been announced. This new combination of nylon wheels and stainless steel bearings offers distinct advantages to users in a variety of industries. Nylon wheels running fully enclosed on steel track are approximately 80 per cent more quiet than steel wheels running on steel track. Where moisture is a problem, stainless steel bearings and nylon wheels combine to eliminate bearing corrosion. Tests have proved that the new chain outlasts standard steel chain — especially where water or high humidity conditions exist. Nylon wheels and stainless steel bearings are resistant to most common organic solvents, alkalis and most organic acids.

**(Check No. 912 on Service Coupon)**

## MOLDED PLASTICS IN USE

A bulletin explaining the innumerable advantages of molded plastic for appliance parts is now available. The potential for adapting existing designs to plastic production, and the merits of such a development are thoroughly discussed. Typical applications for washers and dryers, refrigerators and freezers, air conditioners, vacumm cleaners, fans, tv and radio sets, are analyzed.

**(Check No. 913 on Service Coupon)**

## WELDING EQUIPMENT GUIDE

**New** A new buyers' guide for welding equipment is available. The 20-page illustrated bulletin covers many types of welding equipment, electrodes, and accessories. Included are a-c and d-c general purpose and industrial welders, semi-automatic and automatic equipment, and carbon block brazing equipment. Ratings, dimensions and specifications are given for all equipment as well as complete description and analysis for electrodes.

**(Check No. 914 on Service Coupon)**

## LIBRARY ON ALUMINUM

The fruits of 68 years of development and research are available in literature form. Information on design evaluation, die castings vs. sand, permanent mold or plaster castings; stamping vs. machining, spinning or any other method explained. The best fastening or joining methods are discussed; welding, brazing, soldering, riveting. For information on any of these subjects, you must signify your particular area of interest when requesting the literature.

**(Check No. 915 on Service Coupon)**

## EPON RESIN COATINGS

If you have a product finishing or paint maintenance problem, you may find this booklet on epon resin-based coatings can be of great aid to you. The excellent adhesion, high impact abrasion resistance qualities and outstanding resistance to moisture, heat and corrosives resulting from epon resin based coatings, is thoroughly explained.

**(Check No. 916 on Service Coupon)**

## PRECISION BRUSH FINISHING

**New** Getting double duty from centerless grinding machines is explained in a new, four-page brochure, illustrated with photographs and a brush specifications chart. It tells how to reduce down-time on centerless grinders by extending their use to precision brush finishing on cylindrical parts. Types of finishing possible, and characteristics of brushes needed, are described.

**(Check No. 917 on Service Coupon)**

## ZINC PHOSPHATE COATINGS

A coating you won't crack, chip or peel is explained in this brochure which includes a sample panel for your own perusal. The coating, which stays put under stress, and becomes a part of the metal it coats, helping your particular finish stick, is now available.

**(Check No. 918 on Service Coupoin)**

## COLLET BULLETIN

**New** Collets for lathes, milling machines and grinders are illustrated and described in a new bulletin just published. To facilitate ordering the correct collet, this 8½" x 11", 2-color 4-page bulletin contains a list of the popular lathes, milling and grinding machines and their respective collet numbers; complete ordering instructions, and price and specification table. Listed for immediate shipment is an inventory of collets and feeders for the popular automatic bar machines and turret lathes.

**(Check No. 919 on Service Coupon)**

## ULTRASONIC CLEANING SYSTEMS

**New** Benefits which may be derived from ultrasonic techniques in cleaning and degreasing, electroplating, drilling and grinding operations are reported in new bulletin. The 4-page 2-color bulletin describes various ultrasonic power supplies, transducers, and systems for small and large scale production requirements.

**(Check No. 920 on Service Coupon)**

## PILOT OPERATED CONTROL VALVES

**New** A new six-page bulletin on pilot operated control valves. Printed in three colors, the bulletin describes in detail the operation, uses, optional features, etc., of single and double solenoid valves, and is profusely illustrated with over two dozen half-tone cuts and line drawings. Also included are tables which cover types of service, pressure ranges, condensed specifications and dimensions.

**(Check No. 921 on Service Coupon)**

## PRESSURE FEED PAINT TANKS

**New** A 16-page catalog describing new and improved pressure feed tanks is offered. The illustrated, 2-color catalog includes information on pressure feed material tanks and the quick-fill pressure feed material tanks. Also included is a complete listing of tank accessories.

**(Check No. 922 on Service Coupon)**

**FINISH**
**York Street at Park Avenue**
**Elmhurst, Illinois**

**Please forward to me at once information on the new supplies and equipment and new industrial literature as ennumerated below:**

**No.**_____ **No.**_____ **No.**_____ **No.**_____

**No.**_____ **No.**_____ **No.**_____ **No.**_____

**Name** _____ **Title** _____

**Company** _____

**Company Address** _____

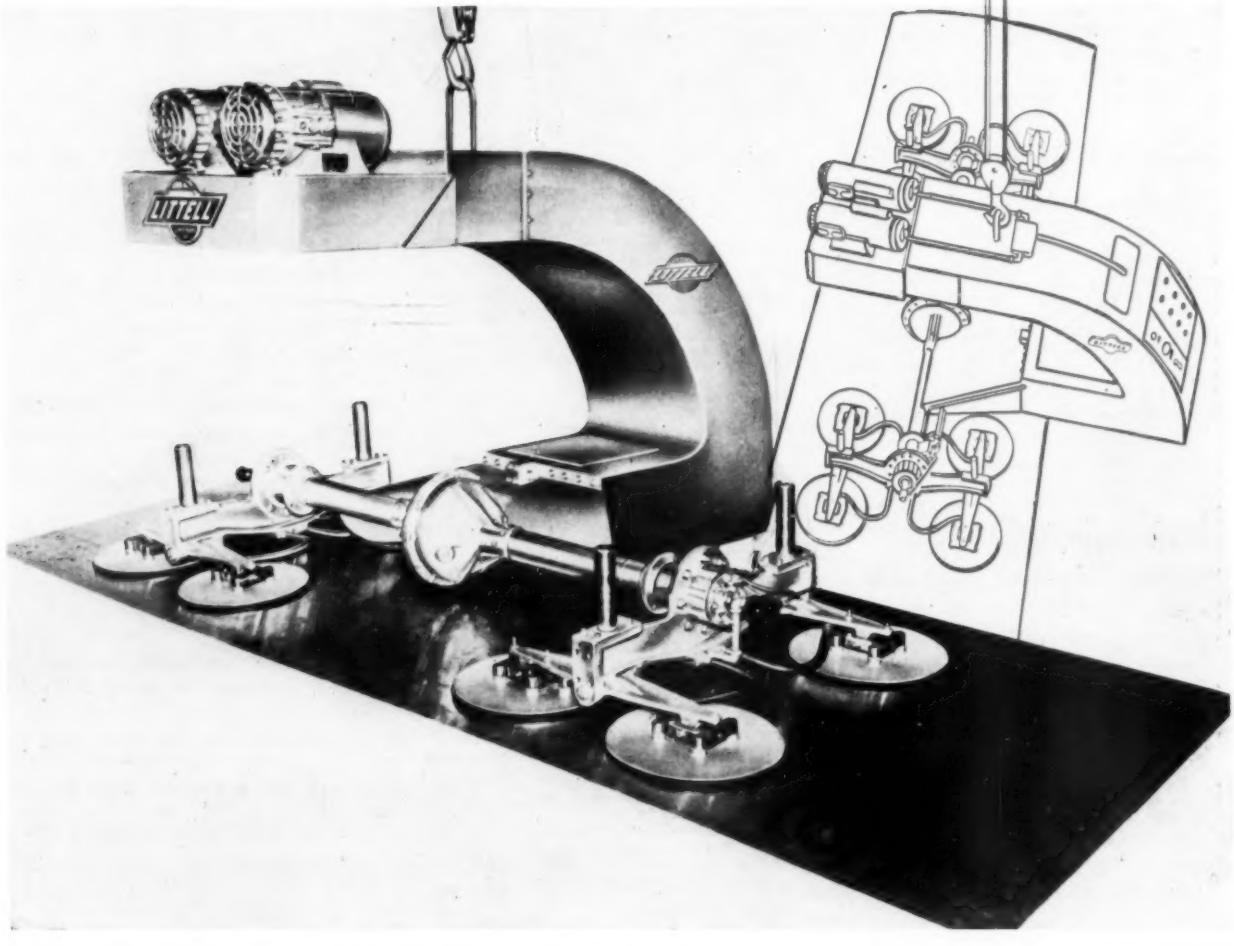
**City** _____ **Zone**_____ **State**_____

# finish SUGGESTION BOX

**NEED MORE INFORMATION**

Source of the information on this page as well as additional details may be obtained by writing to the SPECIAL PROJECTS EDITOR of *finish*.

## Now they've developed a roll-over vacuum lifter that can rotate sheet 180°




AN 8-cup vacuum roll-over sheet lifter has been developed that can rotate sheets a full 180°. The unit, which has a lifting capacity of approximately 14,000 pounds, can easily and safely handle sheets of any non-porous material up to 5 feet wide and 20 feet long weighing 2,000 pounds with a 7 to 1 safety ratio. The lifter is equipped with a U-hook for attachment to over head crane for in-plant movement, and the full operation requires one man.

Eliminating the need for pinch bars for sheet separation, or grappling hooks for load lifting, the vacuum cupped lifter separates and handles the sheet without damage. This is accomplished with the 8-cup vacuum unit which is provided with vacuum received from the two supply pumps through a storage tank. In regard to the sheet lifter's ability to rotate sheet 180°, it is well to point out that rotation may be stopped at any angle from horizontal to the 180°, making inspection of both sides of the sheet a simple operation. This feature also provides an excellent means for vertical stacking of sheets as well as providing for operation, sans vacuum, for movement of inverted plate or sheet. The unit, now available, is also produced for the manufacturer whose operation requires movement of heavier sheet.

# A NEW ACHIEVEMENT IN SPRAY-CLEANING EFFICIENCY

# JET CLEANERS

The JET series was developed to fill the need for economical, efficient, low-foaming spray cleaners to be used on zinc, copper, brass or steel.

- JET CLEANERS step-up the efficiency of your spray cleaning equipment.
- Reduce overflow loss with new low-foaming formula (no silicones or troublesome chemicals), permitting wider range of concentration.
- Carry heavier dirt load without redeposition.
- Remove all types of soil.
- Are harmless to rack coatings and equipment.
- Non-toxic, dust-free, non-caking.
- Offer better results at lower cost.

*Remember* — YOUR COST PER FINISHED ARTICLE IS THE TRUE COST OF YOUR CLEANER

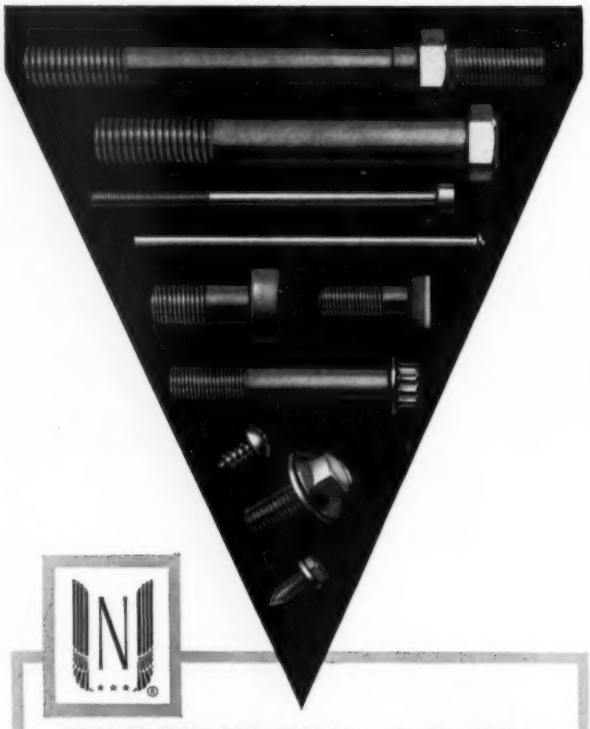
LO pH HI

*Let the Northwest Cleaning Specialist explain JET CLEANERS' advantages in your production.*

**NORTHWEST CHEMICAL CO.**

9310 ROSELAWN DETROIT 4, MICH.

pioneers in pH cleaning control serving you since '32



# NATIONAL LOCK
## Special-Purpose FASTENERS

### Save Engineering And Design Time

Call upon National Lock fastener specialists to participate in your early planning . . . before your designs are frozen. These experienced men will furnish complete information on National Lock screws and bolts of every type, size, finish and material to meet your specifications. You'll be time and money ahead with National Lock. Write today.

- SPECIAL HEADS
- SPECIAL SHANKS
- SPECIAL THREADS

**National Lock Company**
Fastener Division · Rockford, Illinois

*The 10th Anniversary of Dependable "Built-Ins" with*

# Hudee

*World's First and Finest Clamp-Down Frame System*

Just 10 years ago the first Hudee Frame was manufactured by Walter E. Selck and Co. Although this is an historic milestone to both the product and the company, we realize that the event itself is of little consequence to you. Its true importance lies in its significance as a decade of progress for the "built-in" industry.

With the introduction of Hudee came a faster, easier and for the first time, dependable method of installing sink bowls. Since then the Hudee system has been adapted to built-in ranges, drinking fountains, dish washers, etc.

Now, after ten years, in the kitchen and bathroom in millions of American homes, the word "contemporary" means "built-in." Because you could depend on Hudee, a trend was started. As Mrs. America continues her demand for "built-ins" you can continue to depend on Hudee for quality, craftsmanship and progress.

*Progress With A Progressive Industry*

WALTER E. SELCK AND COMPANY

**JOBBERS EVERYWHERE STOCK HUDEES**

*Exclusive Manufacturers of Hudee Frames*

**225 West Hubbard St. • Chicago 10, Illinois**

IN CANADA • Walter E. Selck and Co., Ltd., Toronto

## CONTROLLED SCREW DRIVING CLUTCH NOW BEING OFFERED

**New** An adjustable safe torque screw driving clutch gives accurate control of torque under a wide range of driving conditions—from free running to gathering. This clutch delivers consistent torque through a new principle of an overrunning roller drive. The clutch is rated from 10 to 108 inch-pounds. It can be used for driving either right- or left-hand threaded fasteners.

**(Check No. 923 on Service Coupon)**

## INTERVAL TIMERS

Details on electric-mechanical circuit interval timers are available in this special bulletin which contains information on applications, plus Underwriter laboratory listings.

**(Check No. 924 on Service Coupon)**

## PORTABLE PLATING UNIT

**New** Literature illustrates and describes "jet" plater as a complete electroplating plant in a compact, portable cabinet. Details and specifications of the unit are presented in an interesting, easy-to-read manner, with lines directing the reader to the location on the streamlined cabinet of the components being described.

**(Check No. 925 on Service Coupon)**

## BALL MILL GRINDING

Full details on how to get better ball mill grinding is available in this bulletin which explains the potentialities of high density grinding balls for improving manufacturing procedures and obtaining greater mill economy.

**(Check No. 926 on Service Coupon)**

## DISC SANDERS, GRINDERS

**New** An attractive new folder has been prepared showing a greatly improved and enlarged line of disc sanders and grinders. Sizes now range from 16" to 36", with single and double disc models in each size.

**(Check No. 927 on Service Coupon)**

## SLIP ROLL FORMERS

**New** Bulletin describes a new line of slip roll forming machines equipped for rapid forming of obround and rectangular shapes. Both power and hand operated models are available with this optional feature. The bulletin also includes an explanation of the factors governing the selection and operation of slip roll formers and a full description of standard line slip roll forming machines for cylindrical work.

**(Check No. 928 on Service Coupon)**

## RESISTANCE WELDING TECHNIQUES

**New** This 12-page bulletin has as its general object the instruction of resistance welding techniques. Specific fastening methods discussed in detail are spot, seam, projection, and flash-butt welding. Overall design considerations are described. Types of resistance welding are discussed and a section is devoted to literature available on the subject and a brief description of each publication.

**(Check No. 929 on Service Coupon)**

## LACQUER SPRAY BOOTH COMPOUND

**New** A new, non-caustic, non-oily, non-foaming compound for conditioning the water, protecting equipment and reclaiming in all types of water-type spray booths has been announced. Especially formulated for use with lacquers, it does not digest the material or break it up into small particles. It operates on an entirely new principle, forming a protective film around laquer molecules and causes them to float rather than sink. The "captured" material can be skimmed off and is in excellent condition for reclaiming.

**(Check No. 930 on Service Coupon)**

READER SERVICE CARD APPEARS ON PAGE 73

Cowles Ty-Bond zinc phosphate coating will stay on the base metal—and protect it.

Cowles Ty-Bond expands with your base metal; contracts with your base metal; holds your paint or other finish on your base metal—because Ty-Bond zinc phosphate coating becomes a part of your base metal.

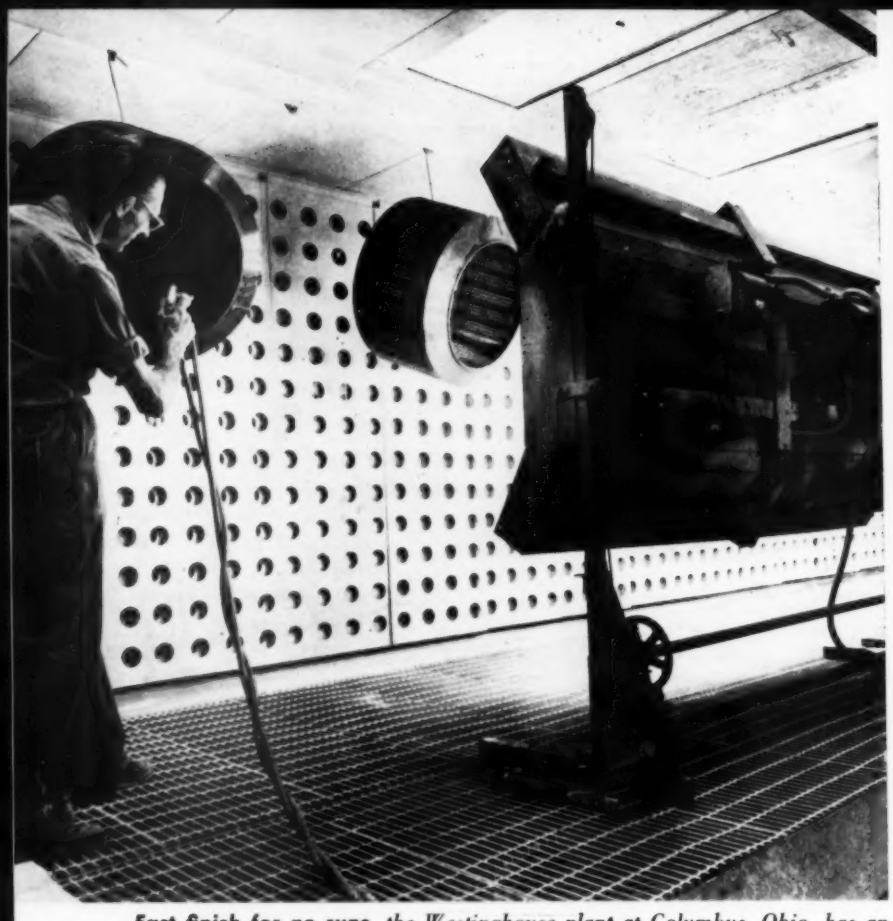
*Send this coupon and get this Ty-Bonded Test Panel*

Cowles Chemical Company
7012 Euclid Avenue
Cleveland 3, Ohio

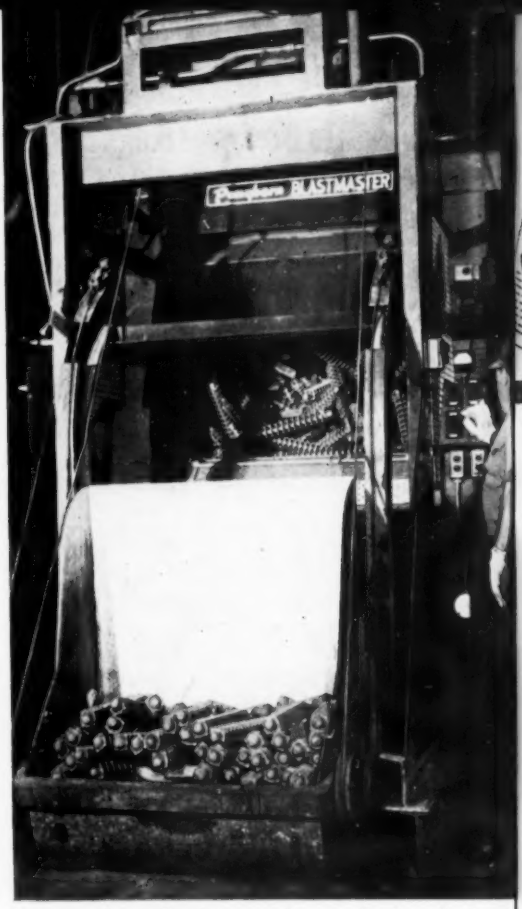
Send me a Ty-Bond Test Panel

Name_____
Company_____
Address_____
City_____ State_____

Cowles CHEMICAL COMPANY
CLEVELAND 3, OHIO

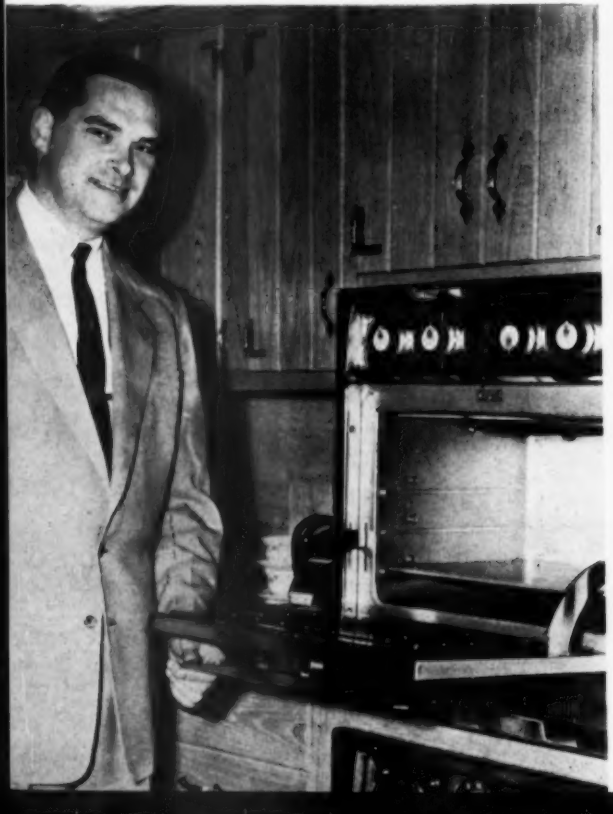


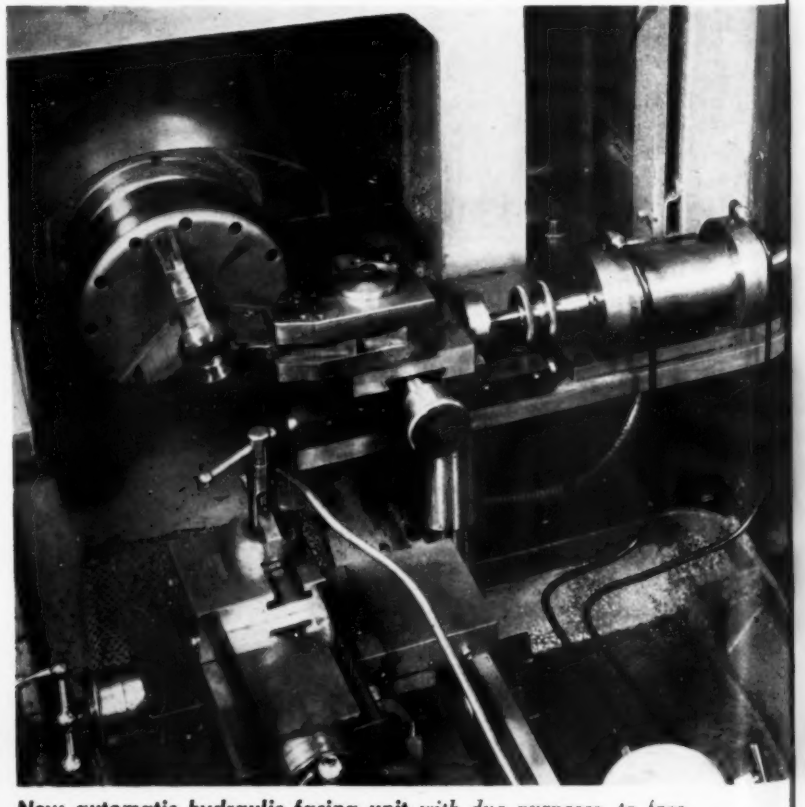
**Fast finish for no runs,** *the Westinghouse plant at Columbus, Ohio, has an infrared oven to temporarily set coatings on washing machine spinners and roaster pans. The Fostoria oven installation, which includes two heat source banks, quickly sets the porcelain enamel coatings to prevent running into corners and joints as the parts are in the process of being porcelained.*



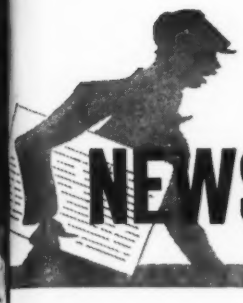

**Improved production** — *the result of replacing si blast barrels and ten tumbling mills with four Roto Pangborn Corp. barrels — has upped blast cleani piston ring castings 2 to 3 times and improved q for Muskegon Piston Ring Co. of Sparta, Mich*

**Timers for microwave cooking** *are given an inspection by Lux Clock Mfg. Co. Presidential Assistant Paul Lux, shown here viewing an installation of his company's product in the new Tappan electronic range*





**New automatic hydraulic facing unit** *with duo purposes, to face as well as bore, for ferrous and non-ferrous materials simultaneously, has been announced for the machine tool field. Equipped with control dials for fine facing adjustments, simply installed, the unit is now available from Baloch Instrument Co., College Point, N.Y.*



# NEWS about Suppliers

## CIRCO EQUIPMENT FORMS WASHER EQUIPMENT CORP.

The formation of Circo Cleaning & Finishing Corp. as a wholly owned subsidiary of Circo Equipment Co., Rahway, N. J., has been announced by President Melville Morris. The new firm, Morris announced, was created to fill the growing need for metal parts washers, power spray washers, dryers, ovens and complete finishing system. The new firm will design, and construct, custom-planned installations of all sizes, from the smallest conventional parts washers to multi-unit, fully automated systems which have integral washers, dryers and paint units. Officers of the new subsidiary are President Morris, Jerome Scherzer, vice president; Stanford Barlett, manager, and Henry Stanly, chief engineer.

## AMERICAN SMELTING TO EXPAND CONTINUOUS CASTING FACILITIES

American Smelting and Refining Co. will spend over $1,250,000 to expand its Perth Amboy, N. J. facilities for continuously casting bronze foundry alloys, it has been announced by J. D. MacKenzie, vice president in charge of operations. The expansion program will begin this year and will increase the plant capacity by approximately 50 percent. Two new continuous casting furnaces will be installed in the enlarged plant structure.

## HONEYWELL BUYS PLANT TO HOUSE TRANSISTOR UNIT

Purchase of the Hathaway plant in Boston was announced recently by Minneapolis-Honeywell Regulator Co. The three-story, 250,000-square-foot plant will house Honeywell's Transistor Division — engineering, production and sales — that is scheduled for transfer to the Boston area from its present location in Minneapolis. The activities and administration will be integrated with those of Honeywell's Doelcam Division, also located in Boston. After extensive modernizations the new facilities are expected to be in production by mid-December, George J. Schwartz, vice president and general manager, said. Primary improvements will include adding air conditioning and humidity control systems to the production areas manufacturing the sensitive transistors, tyros and other precision instruments.

## FOOTE EXPANDS PLANT

Over half a million dollars will be spent on improvements at Foote Mineral Co.'s King Mountain plant during 1956 and 1957, according to L. G. Bliss, president. Plant capacity will not be materially affected.

## ARMCO WILL MAKE HOUSTON NEW ALLOY STEEL CENTER

An expansion project that, it is said, will make Houston, Tex. the chief source of high strength alloy steel in the Central United States has been announced by officials of Sheffield Steel, division of Armco Steel Corp. Construction of a large heat treating plant at the Sheffield mill on the ship channel will begin in the near future. It will provide facilities for heat treating, tempering, normalizing, and annealing special alloy steel bars and plates.

## METAL & THERMIT DEDICATES GENERAL OFFICE BUILDING

Metal & Thermit Corp. recently dedicated its new general office building, completed as part of a $2,500,000 combined general office, research and distribution center, in the Woodbridge-Rahway area of New Jersey.

## YALE AND TOWNE SALES-SERVICE BRANCH OPENED IN FRESNO, CALIF.

The Yale & Towne Mfg. Co., Philadelphia, has announced the opening of an industrial lift truck sales and service sub-branch in Fresno, Calif. in line with a recently announced program of western sales and service expansion. The new sub-branch is located at 410 Broadway, Fresno, along Highway 99 toward Los Angeles. W. J. Stroud will head the operation. T. C. Collins, formerly of the San Francisco branch, will be service manager.

## AMERICAN ZINC INSTITUTE MOVES TO NEW QUARTERS

The American Zinc Institute, Inc. now occupies new and larger offices in Suite 2020 of the Lincoln Building, 60 East 42nd St., New York 17, N.Y., it is announced. According to John L. Kimberley, executive vice president of the AZI, the Institute's new and expanded facilities will enable it to serve more efficiently and expeditiously those industries producing and using zinc and zinc coated products.

## FORM NEW NATIONAL LP-GAS COUNCIL GROUP

Formation of a dynamic new National LP-Gas Council membership committee, dedicated to winning new members and broadening participation of present members, has been announced by Harry R. Thomas, the council's national membership chairman. Thomas, member of the council's executive committee and vice president of Tuloma Gas Products Co., Tulsa, Okla., said the committee's objectives are to increase and broaden participation of all members of the industry in the council and its activities, bring enough money into the treasury to support an intensified LP-Gas promotion effort, and develop a long-range membership program which will continually bring in new members. The committee includes six co-chairmen, one for each division of the industry represented in the council. They are William R. Lund, manager of marketing research for Warren Petroleum Corp., Tulsa, Okla., producer chairman; Arthur E. Bone, president of Eastern Propane Co., Malvern, Penn., eastern marketer chairman; Talmage Lovelady, general manager of the Pure Gas Service Co., Worland, Wyo., western marketer chairman; Julius Klein, president of the Caloric Appliance Corp., Philadelphia, Penn., manufacturer chairman; Herman Merker, president of Pressed Steel Tank Co., Milwaukee, Wisc., tank and cylinder chairman; and Charles Corken, president of Corken's Inc., Oklahoma City, Okla., equipment chairman.

## LaSALLE STEEL UPS KELLY

Thomas A. Kelly has been elected executive vice president of LaSalle Steel Co., Hammond, Ind. He was formerly vice president and treasurer.

if your firm—
uses parts anything
—like these . . .

we'll show you
how to—

reduce
your
costs!

Through Albion's modern *resin shell* casting techniques, pearlitic and ferritic malleable irons may be cast to your specifications and tolerances with physical properties to suit your specific range of applications.

And more important, Albion's *resin shell molded* pearlitic and ferritic malleable iron castings combine the advantages of both castings and forgings. They're produced to extremely close dimensions to eliminate excess metal as well as machining or grinding operations; for greater production time, tool and labor savings.

***Phone your Albion Malleable Iron Company representative today. He can show you how to save valuable time and dollars through Albion's modern casting techniques.***

*Albion's Research and Development Laboratory facilities are at your disposal. Whether you are designing new or reviewing present parts, Albion's engineers are anxious to assist you.*

ALBION MALLEABLE
IRON CO. ALBION MICHIGAN


## LANG, CURRY TO WYANDOTTE

Ronald J. Lang has joined the industrial sales and service staff of Wyandotte Chemicals Corp., Wyandotte, Mich. Kenneth R. Curry has joined the staff of the New York City district office.

## MILGRAM TO FOOTE MINERAL

Joseph B. Milgram, Jr., has joined Foote Mineral Co., Philadelphia, as chemical sales engineer, according to James Fentress, general sales manager.

## INTERNAT'L. PAPER UPS HEWITT

Edward G. Hewitt has been named assistant sales manager of International Paper Co.'s Wooster, Ohio, shipping container plant, Arthur B. Damon, Container Div general manager, has announced. Hewitt formerly was assistant sales manager of the St. Louis division.

## KELITE PRODUCTS UPS THREE SALES EXECUTIVES

Albert W. Lupien, former sales manager, Midwestern area, for Kelite Products, Inc., Berkeley Heights, N. J., has been promoted to regional vice president. G. Stuart Krentel has been named manager of technical sales service for the western region, and W. John Boyd has been promoted to metropolitan Chicago district sales manager.

## HALL TO HOMMEL SALES STAFF

The appointment of Arol Hall to the porcelain enamel frit sales and service staff of The O. Hommel Co., Pittsburgh, has been announced by Ernest M. Hommel, president. Karl K. Kuberek has been promoted to the sales staff, Ceramic Color Division.

## GLIDDEN NAMES RICHARDSON TO NATIONAL SALES POST

Appointment of George B. Richardson as national manager of industrial maintenance sales for The Glidden Co. Paint Div., Cleveland, has been announced by A. D. Duncan, Glidden vice president and general manager of the division. Richardson was formerly national accounts representative.

## CRANE UPS TWO IN SALES

Crane Co., Chicago, has announced the appointments of J. W. Greene to director of industrial sales and W. A. Burbine to director of heating sales. Greene formerly headed sales in the east, and Burbine was in charge of sales operation in the mid-west.

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### *"PERFORMANCE TESTED" FRITS*

You can be sure of dependable performance . . . stability over a wide firing range . . . uniform production, minimum reoperation . . . when you use O. Hommel frits. Each lot of frit produced by the O. Hommel Company is pilot-plant-tested under actual use conditions before being cleared for shipping. And this *performance testing* means *proven performance* for uniform, trouble-free production for you.

Why don't you try OHCO frits and see for yourself? Your O. Hommel representative will be glad to arrange a demonstration. Ask him, or write to . . .

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**PITTSBURGH 30, PA.**

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***ALL of the people who count in the appliance and fabricated metal products manufacturing industry***

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### 1 QUALIFIED, 100%-VERIFIED DISTRIBUTION

The selective, 100%-verified circulation of **finish** is unique in the metalworking field. **finish** readers are buying influences in appliance manufacturing, and in those phases of fabricated metal products manufacturing with similar procedures, techniques, interests and problems. **finish** has verified and qualified every one of its over 10,000 industry readers, according to the stringent, selective rules of BPA.

### 2 MORE AND BETTER EDITORIAL CONTENT

**finish** gives its readers by far the most comprehensive and competent coverage of appliance and metal products manufacturing. In 1955, **finish** carried 242 more pages of editorial (59% more) than the second publication serving the field. Its experienced staff, consultants and contributors provide idea-stimulating, quality editorial material that earns loyal readership. In editorial quantity and quality, **finish** overshadows any other publications reaching the appliance and metal products manufacturing field.

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Dana Chase PUBLICATIONS

YORK STREET at PARK AVE. ELMHURST, ILLINOIS

THE MAGAZINE OF *Appliance* AND Metal Products MANUFACTURING

Reprinted from June and August, 1956, issues of INDUSTRIAL MARKETING.


## SUPPLIER PERSONALS CONTINUED

Appointment of *John K. Cochran* as manager of production for the fiber glass division of Pittsburgh Plate Glass Co. is announced by R. A. McLaughlin, general mgr., fiber glass division.

*Hugh D. Connell* (below) has been named manager of the Project Engineering Dept., Acme Steel Co., Chicago, it is announced by *John E. Ott*, vice president, new products. Connell has been with Acme since June 1947, when he joined as a sales engineer.

JAMES GILES

H. D. CONNELL

*James H. Giles, Jr.* (above) has been appointed to the research and development staff of O. Hommel Co., Pittsburgh, Penn., it is announced by Ernest M. Hommel, president.

*Lester R. Medlen,* Fort Wayne, Ind., has been made a staff engineer for Fort Wayne Corrugated Paper Co., *K. R. Martin,* coordinator, engineering services, has announced. Medlen will specialize in mechanical engineering and headquarter at Hartford City, Inc., where the engineering staff of the company is located.

*Richard Glen Howser* has been named industrial representative for Wyandotte Chemicals at Denver, Colo. Howser has completed an intensive product application schooling in the Wyandotte Chemical's Research and Technical Service Laboratories.

*Harold E. Martin* has been named product sales manager, metal parts, for Sylvania Electric Products, Inc., Warren, Penn., it is announced by Parts Division General Sales Manager *Philip Pritchard*. Martin will have his office at the Sylvania facility at York, Penn., and will be responsible for sales of metal parts produced at the York and Naugatuck, Conn., Parts Division plants.

## ELCO SCREWS ARE GOOD SCREWS
### Ask a man who has used them

### COLD-HEADED SPECIALS REDUCE COSTS...

ELCO Cold-Heading is the logical and low-cost method of manufacturing pieces such as are shown above. Complex machining operations are avoided, accuracy is maintained, uniformity insured, and production speeded up. Our experienced engineers are available to assist in design or re-design of your pieces to take advantage of ELCO Cold-Heading. *Send us your prints!*

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- MACHINE SCREWS
- MACHINE SCREW NUTS
- TAPPING SCREWS
- THREAD-CUTTING SCREWS
- PHILLIPS AND SEMS SCREWS
- PIPE PLUGS
- STOVE BOLTS
- CAP SCREWS
- LAG SCREWS
- DRIVE SCREWS
- SPECIAL SCREWS
- COLD HEADED PRODUCTS

WE ALSO SPECIALIZE IN MAKING ANY OF OUR PRODUCTS OF THE FOLLOWING MATERIALS

| | | |
|---|---|---|
| Stainless Steel | Copper | Monel |
| Bronze | Silicon Bronze | Aluminum |
| Brass | Ambrac | Special Analysis |

**ELCO TOOL AND SCREW CORPORATION**
1960 BROADWAY • ROCKFORD, ILLINOIS

### INDUSTRIAL OVENS

Ovens Engineered and Designed to meet your particular plant layout and process requirements. Insulated Panel construction on Structural Steel Framing. Designs include: Compartment Type; Horizontal Type; Vertical Type; and "A" Type; floor or overhead mounted with continuous or intermittent conveying—Indoor, Outdoor, or Roof Installations.

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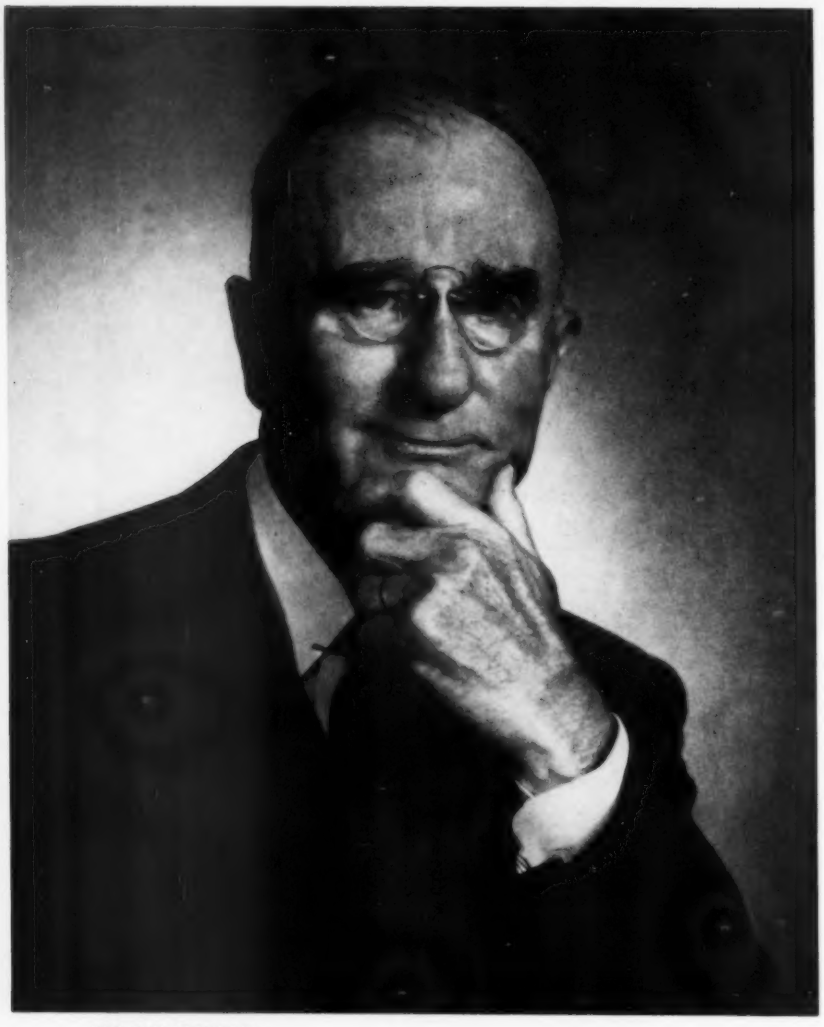

W. W. SEBALD

# Armco's 1st traveling salesman

ON August 15, 1956, the man who started at Armco as an office boy, and eventually became its president, observed his 50th anniversary with our company.

Armco in the year 1906 was a little company, competing with big and powerful companies of the steel industry. It was teetering on the brink of bankruptcy. But the new office boy knew little of those financial problems. To him, Armco was a "big" company, and he went to work with energy and the determination to make good.

His first big chance came soon after he was on the payroll. A contractor in Tennessee asked for help and advice about some Armco metal lath he had bought, and there was no one to send but the office boy. Armco's sales manager took a chance and sent W. W. Sebald.

The office boy not only helped the contractor out of his difficulty, but made some sales calls as well. He came back to Middletown with a fat order in his pocket for several carloads of galvanized roofing. He had automatically promoted himself to a job as salesman. He was then only nineteen years old.

For a time, W. W. Sebald was Armco's only traveling salesman. In 1912 (at age twenty-four) he opened Armco's first district sales office in New York City. Both Armco and W. W. Sebald were on the way up.

America went to war in 1917. W. W. Sebald joined the U. S. Navy as a Seaman, Second Class. He bought himself a bundle of textbooks on English, mathematics and science.

He tackled the textbooks with the same determination that he had demonstrated on his Armco jobs. The Navy liked that about him, and by the war's end, he had risen to the rank of ensign. When the war ended, W. W. Sebald returned immediately to Armco.

Armco brought him back to Middletown and, in 1919, made him assistant manager of the sales division. A short four years later he became assistant vice president. In 1926, he was elected vice president in charge of all of Armco's commercial activities. He was ready for more responsibility when the board of directors elected him a member in 1938, and ten years later he was chosen to head Armco as the company's third president.

In the eight years since he became Armco's president, the company has experienced its greatest period of growth and prosperity. Armco has an outstanding organization of trained and efficient men and women on its payroll. It is a progressive company, and its prospects are for a bright and secure future in the years ahead.

But its president often says, "Yes, Armco's a big company now. But I hope we can always continue to operate as a small company." He has always believed Armco should be a warm and friendly place to work.

R. L. Gray

*Ed Note: In line with Armco's policy of promoting promising young men, W. W. Sebald was upped to vice chairman of the board, August 15 and R. L. Gray named president. Announcement was made at a special banquet held to honor Mr. Sebald as he completed his 50th year.*

*October · 1956*

# safe transit

**FROM ASSEMBLY LINE TO FINAL CUSTOMER**

October, 1956

# safe transit

editorial voice of the national safe transit program

devoted to improving packaging methods and shipping and materials handling methods for the appliance and metal products manufacturing industries. This section contains plant experience information and industry advances for the use of all executives and plant men interested in improving packaging and shipping methods and in loss prevention. The section contains complete information on the national safe transit pre-shipment testing program for packaged finished products and detailed reports of divisions and sub-committees of the National Safe Transit Committee.

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DANA CHASE PUBLICATIONS
York Street at Park Avenue
Elmhurst, Illinois

published monthly as special section of finish — the magazine of appliance and metal products manufacturing

## Stage set for industrial packaging-materials handling exposition at St. Louis, Kiel Auditorium, Oct. 22-25

In St. Louis, Mayor Raymond R. Tucker receives an authentic working scale model of the Towmotor model fork Lift Truck from representatives of the Society of Industrial Packaging and Materials Handling Engineers in appreciation for a proclamation issued designating the week of October 22nd as "Scientific Protective Packaging and Materials Handling Week" as a salute to the exposition and short course which will be held in St. Louis at Kiel Auditorium.

### Group pose with mayor

In the group are, left to right: R. C. Engle, Atlas Paper Co., member of the general committee; Elmer A. Kruse, Wagner Electric Co., chairman of the planning committee; Stephen W. Vasquez, Dean of the School of Commerce and Finance, St. Louis University, coordinator of the Short Course; Mayor Tucker; Harold Wiese, Wiese Planning and Engineering Co., Inc., of the Short Course Committee; W. Vernon Swofford, Sefton Fibre Can Co., general chairman of the Exposition; and Arthur C. Meyers, Jr., assistant professor of Economics at St. Louis University

### Expect some 10,000 visitors

The exposition is expected to attract approximately 100 exhibitors of protective packaging and materials handling supplies, equipment, and services, and approximately 10,000 visitors from all over the country. Several hundred of them will register for the annual Short Course in protective packaging and materials handling that will be directed this year by St. Louis University.

The Oct. 22-25 "triple feature" events will be sponsored by the Society of Industrial Packaging and Materials Handling Engineers, whose headquarters are in Chicago, but whose 2,000 members are located in 20 chapters from coast to coast, including St. Louis. Elmer Kruse of Wagner Electric Co. is president of the St. Louis "host" chapter.

Following close upon the heels of St. Louis' world famous annual "Veiled Prophet Festival," the SIPMHE exposition will stress the theme of "Veiled Profits in Protective Packaging and Materials Handling."

The competition, presented simultaneously with the exposition, will draw entries by packaging and materials handling engineers representing many of the country's very largest industries, as well as small ones. The competition is divided into seven classifications to feature all types of materials handling and protective packaging with cash awards going to the winners in each classification and the ornate Harold Jackson Award Trophy going to the "Best of the Show" entry.

This Northwestern Candy Vending Machine is properly protected for safe shipment through the use of a Watkins Container built by Illinois Box and Crate Co.

# The Finest Products Go In Watkins Containers

**They are preferred because of:**

1. Low Cost
2. Stacking Strength
3. 75% Assembled–Upon Receipt
4. Ease of Assembly
5. Easy Handling
6. Minimum Storage Space
7. Protection from Dust and Dirt

**THESE COMPANIES BUILD WATKINS CONTAINERS**

**COZIER CONTAINER CORP.**
446 East 131st Street, Cleveland, Ohio

**CRATE-RITE MFG. CO.**
1015 Orient Street, Oakland 7, California

**DURA-CRATES, INC.**
940 E. Michigan St., Indianapolis, Ind.

**HEMB & MARTIN MFG. CO.**
P.O. Box 108, Murfreesboro, Tennessee

**ILLINOIS BOX & CRATE CO.**
811 Center Street, Plainfield, Illinois

**KIECKHEFER BOX & LUMBER CO.**
1711 W. Canal St., Milwaukee 3, Wis.

**LEWISBURG CONTAINER CO.**
[illegible]

**LOVE MFG., INC.**
P.O. Box 546, Wichita, Kansas

**UTILITY CRATE CORPORATION**
2019 Imperial St., Los Angeles 21, Calif.

*Custom Protection . . .*

THE **WATKINS CONTAINER** MANUFACTURERS

# Best Way to Better Shipping . . . Engineered Containers by General Box

If you must keep shipping costs and shipping department costs down, yet see that shipments go out on time, packed to arrive at destination in perfect condition, let General Box help you.

General maintains design and testing facilities unmatched in the industry, staffed by design engineers with specialized experience. A General-engineered container for your product will provide maximum protection with minimum weight, go together fast, and be easy to pack. Time and labor costs in the shipping department are reduced, shipping costs are kept low, and damage is reduced or eliminated.

General's modern production methods and rigid quality control keep container costs at a minimum, yet assure the precision that means both easy assembly and maximum strength. Eleven strategically located plants to serve you.

General Box will be glad to work with you to improve your shipping and cut your costs. No obligation. Write for complete information. Send for a free copy of illustrated informative booklet, "The General Box."

Factories: Cincinnati; Denville, N. J.; East St. Louis; Detroit; Kansas City; Louisville; Milwaukee; Sheboygan; Winchendon, Mass.; General Box Company of Mississippi, Meridian, Miss.; Continental Box Company, Inc., Houston.

**Engineered Containers for Every Shipping Need**

• Wirebound Crates and Boxes • Generalift Pallet Boxes • Corrugated Boxes • Stitched Panel Crates • All-bound Boxes

**General Box**

**1823 Miner Street, Des Plaines, Illinois**

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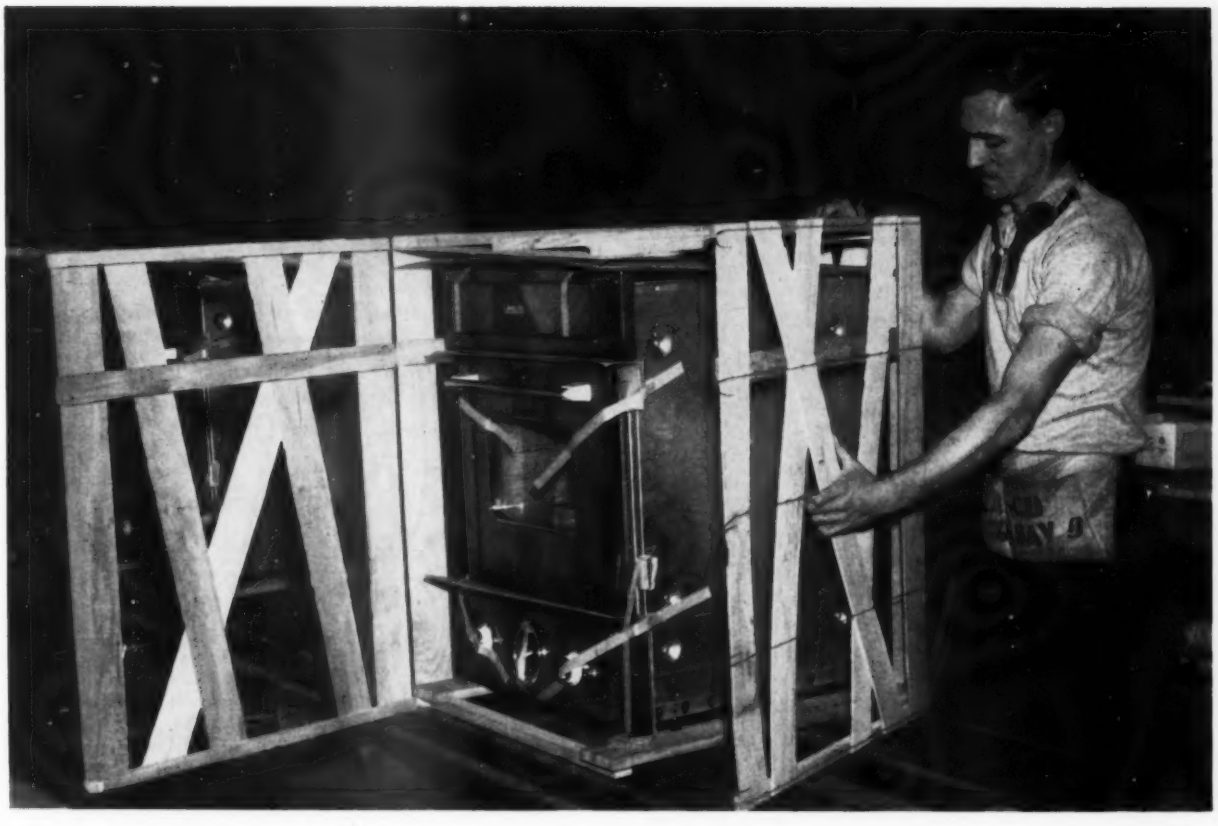


# Assuring safe transit at Vernon Furnace

**final packaging materially speeded, company reports, by using wire-bound wooden crates for their stack-on and built-in ovens**

NATIONAL SAFE TRANSIT labels sported crates packed with "Vernois" stack-on and built-in ovens is evidence that the Mt. Vernon Furnace and Manufacturing Co. of Mt. Vernon, Ill., has done their utmost in pre-shipment testing to whip the problem of intransit damage.

The stack-on gas and electric ovens are designed for use on kitchen counter tops or special bases. The built-in ovens are designed for the conventional installation in recesses for a flush wall. Both are designed to enhance the appearance of the modern "living kitchen".

### Type of products

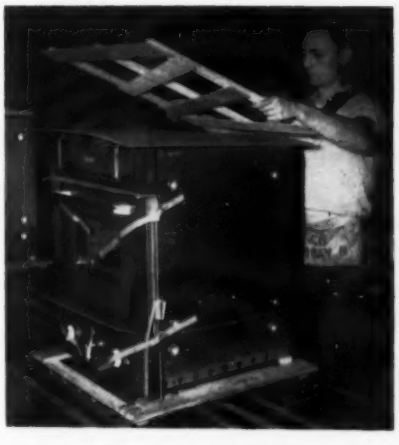
Stack-on ovens are porcelain enameled on the front, sides, and top, except for models having stainless steel front panels. Built-in ovens are equipped with either stainless steel or porcelain enameled front panels. Then, the ever-existing problem is to prevent damage during transit between the Mt. Vernon factory and final delivery.

### Gains NST approval

The N.S.T. label was bestowed upon the "Vernois" pack when the Mt. Vernon Furnace and Manufacturing Co. developed its present packing procedure which involves the use of open type crates and carefully planned interior packing and taping.

The careful development of the pack followed by the application of the N.S.T. test procedures has resulted in a reduction in damage and the elimination of the embarrassment and expense that occurs when damaged merchandise is delivered. The Safe Transit label tells dealers and distributors at a glance that these precautions have been taken.

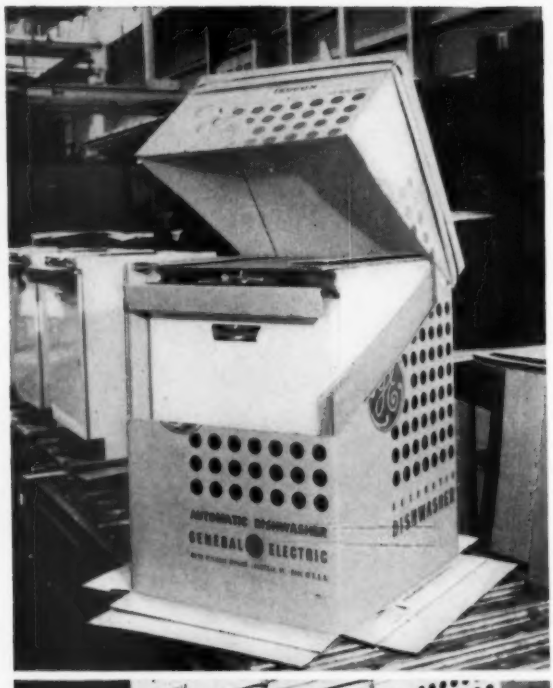
*to Page ST-11* →



*ONLY INTERIOR PACKING used is insulating-material atop oven, plus secure taping of doors and controls. Unit was assembled on crate base. Here, crate top is positioned.*

# CUTS HANDLING TIME 50%

## with International shipping containers




General Electric tested this corrugated container thoroughly in its laboratories before adopting it. Our own laboratories made it measure up to rigid specifications. Then, further punishing tests in the field. Result? A container that really slashes handling time . . . reduces damage rate to an all time low!

Other advantages:

- Special tube and cap design enables lift truck to handle easily without pallets.
- Interlocking flange cap provides grip for easier handling by retailers.
- Dust proof. Arrives factory-fresh.
- Containers can be opened without damaging contents . . . reclosed for further shipment.
- Spacious, clean surfaces allow maximum product identification and advertising.

**If you have a problem in container design, write us for full details of our custom design service.**

**Warehouse experience shows cartons will stack six high without pallets.**

**Lift truck inserts the lifting flange under one side of cap, pulls up. Strong construction enables sure, fast lifting, close stacking without usual jostling.**

*International Paper company*

CONTAINER DIVISION

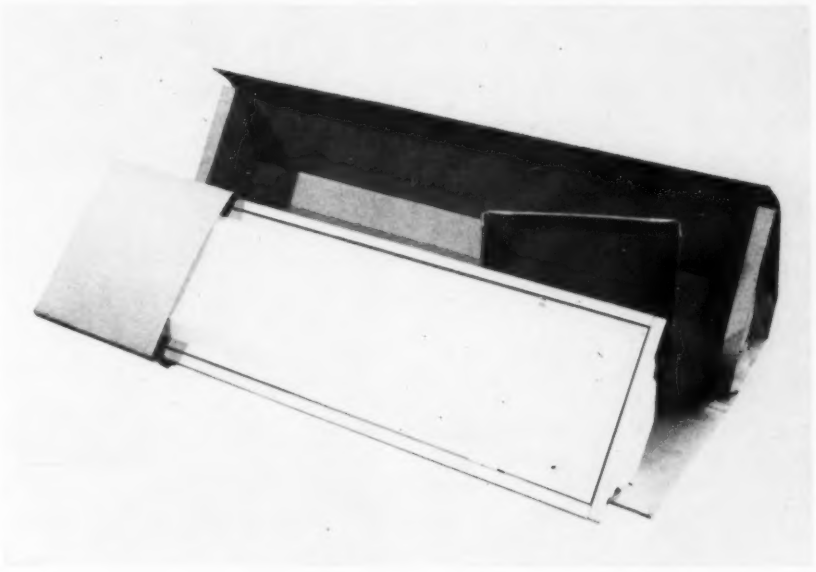
220 East 42nd Street, New York 17, N. Y.

# Wakefield lighting fixture packaged in space saving form-fitted container

A NEW contour fitting container, that saves up to 20% of shipping and storage space previously required, is being used by the Wakefield Company of Vermilion, Ohio, to package an acrylic plastic and metal lighting fixture.

The new container wraps around the fixture to form an hexagonal pyramid stitched at the top and end panels. This construction enables the manufacturer to stack alternate containers inversely, thereby saving space.

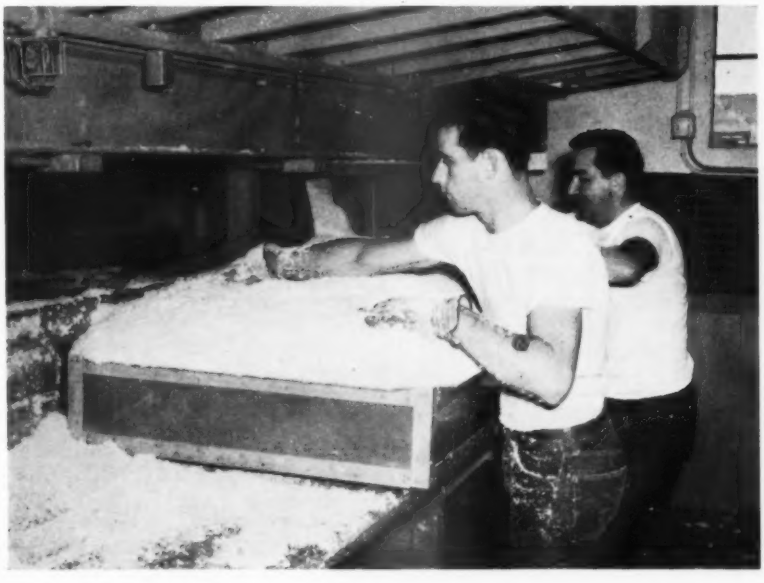
Two die-cut inserts fit over the ends of the fixture and across the plastic panel to give this fragile portion of the product protective cushioning. To assure adequate protection against damage from jarring or rough handling, the end panels of the container are recessed. The new container requires less board than the oblong box which it replaces. It is 200-lb. test C-flute corrugated.



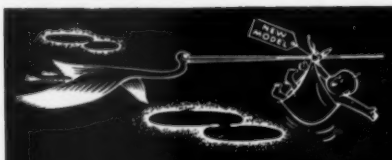
# Foam rubber packaging materials help reduce in-transit losses

PRE-FORMED foam rubber packages, packaging units, and foam rubber slabs that can be band-saw cut into any desired shape and used to cushion a package, are rolling off the production line at American Latex Products Corp., Hawthorne, Calif., to aid and improve the safe transit picture. What makes this facet of American Latex production impressive is that it is entirely a salvage operation.

As one of the nation's largest producers of foam rubber mattresses and foam rubber products for the furniture and aircraft industries, it is only natural that a large amount of scrap and waste originates along the production line. This scrap and waste is gathered, then ground to coarse sawdust size in a hammer mill. It is then blown through a pipe into a huge hopper where it is mixed with raw liquid latex which acts as the ultimate bonding agent.



The latex-foam rubber mixture is then fed through a spout directly into a mold conforming to the shape of the desired package, packaging unit, or slab. Density of the final product is controlled by the degree of packing in the mold. This density can be varied between about 7 and 40 lbs. per sq. ft., and depends upon the weight of the product to be packaged. The mold then goes into an oven where the mixture is "cured" at 240°F. into a solid mass. The net result is a foam rubber (called Moldtex") package, packaging unit, or slab which can be cut into any desired shape for package cushioning, which will absorb the utmost in shock or bumping without transmitting the force of the blow to the packaged product.

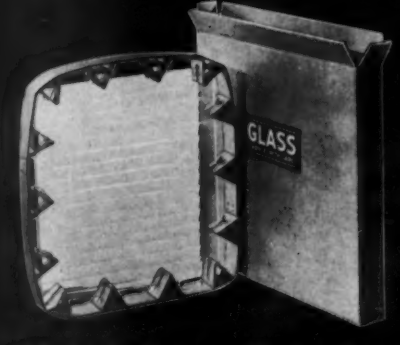



# *Safe Arrival Is Important*

## The best equipment is only as good as the condition in which it arrives.

YOU might say that the Royal Electric Manufacturing Company, Chicago, was quite proud of the label which their switch gear crate is wearing these days. The company, which manufactures a line of electrical equipment ranging from switches to portable electroplaters, gained the approval of the National Safe Transit Committee after their packaged switch gears were given the recommended pretesting procedures. Their brochure announcing that this had occurred was widely circulated. The introduction to the piece of literature is illustrated above. The brochure detailed, with accompanying pictures, the National Safe Transit vibration test and impact test, which their packaged gear switch passed to earn the red and yellow symbol of careful pretesting.

**IN-CARTON** *suspension*
**reduces glass breakage**




**Vertical-Horizontal** suspension safeguards your product in and out of carton . . . Fewer packaging components required . . . pad folding eliminated.

SUS-RAP is engineered to your product and pretested by N.S.T. procedures

SUS-RAP

*Laboratory Developed and Tested Packaging*

VANANT COMPANY, INC. 954 S. Water Street Milwaukee 4, Wis.

"Great idea Johnny — but have you given any thought to what your l'il woman's gonna say when she discovers all her pillows gone?"

The Chicago Mill engineered and laboratory-tested container, designed specifically for air conditioners, is shown in use at the Mitchell Manufacturing Company plant.

## *here's the most practical container for shipping air conditioners!*

In order to meet the requirements of the growing air conditioning industry, Chicago Mill had its engineers design the best possible container for the protection and shipment of air conditioners. The hinged corner plywood container that was developed offers these advantages:

- Maximum protection
- Low cost
- Fast assembly
- You can stack them 20 high for compact storage wtih a good factor of safety

*Contact your Chicago Mill representative for complete information.*

*A shipping container for every shipping purpose*

75TH YEAR

**Wirebound**
**Nailed or Hinge Corner**
**Cleated Plywood**
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**Cleated Corrugated**
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**Shop and Tote Boxes**
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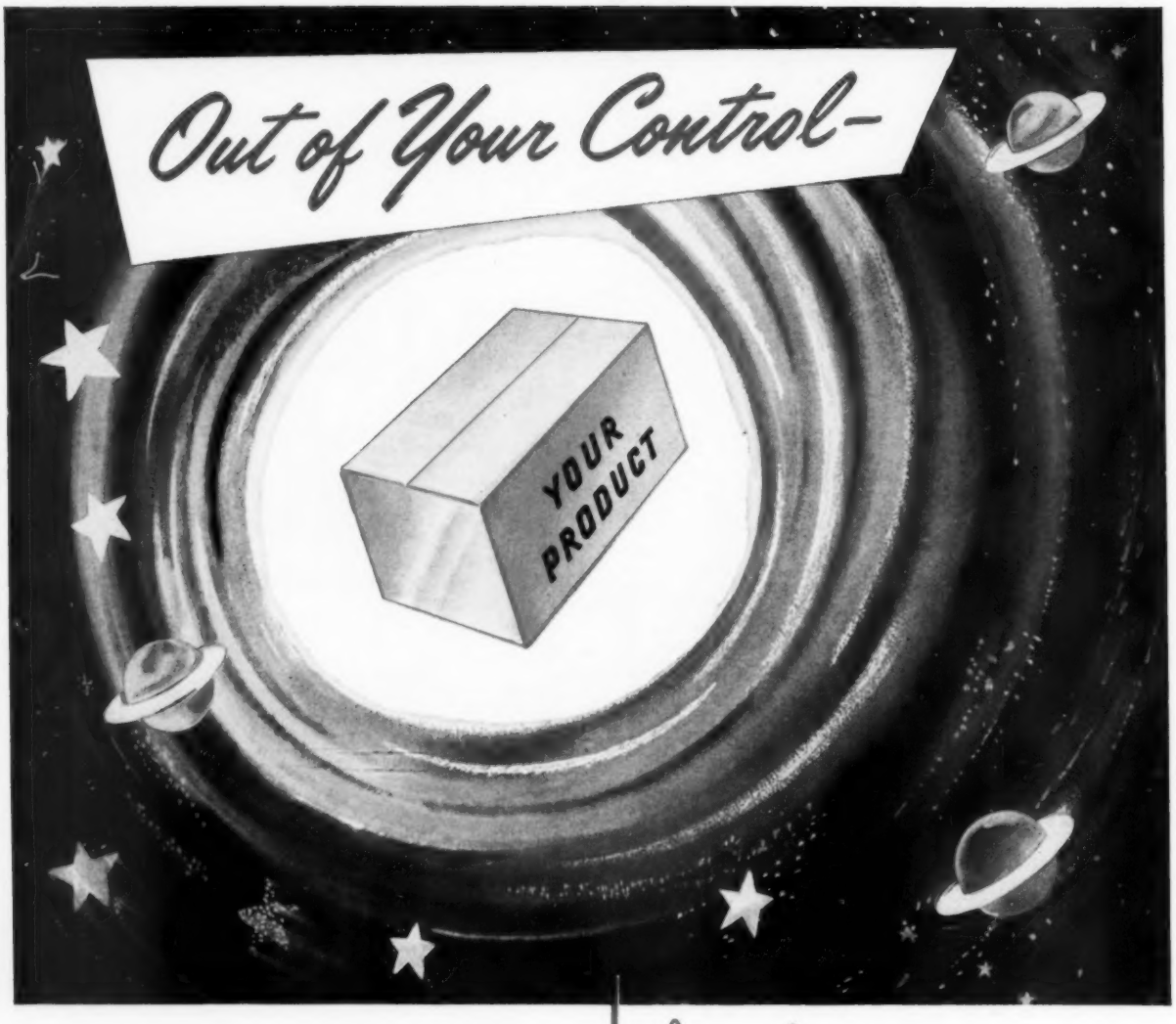
*FOR DOMESTIC OR EXPORT FOR PEACE OR DEFENSE*

FOR SAFER TRANSIT BY • TRUCK • BOAT • TRAIN • PLANE

# CHICAGO MILL AND LUMBER COMPANY

33 South Clark Street — Chicago 3, Illinois

*Plants at:* Helena, Arkansas • Greenville, Mississippi • Rockmart, Georgia
Tallulah, Louisiana • South Fork, Colorado • Chicago, Illinois




## . . . but SAFE in an Inland container!

● As your product goes out the shipping room door, you lose all direct control over its condition. The shipping container becomes its sole defender against the many hazards it must endure until it reaches its destination. An Inland container, carefully engineered and made of quality materials will deliver your product in the condition your customers expect to receive it. That's why we say "Inland Boxes Build Good Will."

If we're not already serving you, call or write today. An experienced Inland Package Engineer is always at your service.

**INLAND CONTAINER CORPORATION**

INDIANAPOLIS 6, INDIANA

Corrugated Fiber Boxes

**MILLS:** Macon, Georgia; Rome, Georgia.

**PLANTS AND SALES OFFICES:** Indianapolis, Indiana; Middletown, Ohio; Milwaukee, Wisconsin; Evansville, Indiana; Detroit, Michigan; Macon, Georgia; Erie, Pennsylvania; Ashtabula, Ohio; Orlando, Flordia; Rome, Georgia; Biglerville, Pennsylvania.

**OTHER SALES OFFICES IN PRINCIPAL CITIES**

**VERNON FURNACE** CONTINUED

→ *from Page ST-5*

Because the wood and wire crates are not affected by dampness, they can be high-stacked safely in the warehouse during even the most humid weather, assurance of maximum use of storage cube.

J. E. Campbell, purchasing agent of the company, points out that in addition to protection against shipping damage, the crates are fast and economical to complete on the production line. They require only a reasonable amount of insulating material and paper for interior packing.

Packing is fast and easy. On the line the base is bolted to an oven before the installation of insulation, burners, controls, doors, panels and other fittings. Upon reaching the packing area from the assembly line, the oven is wrapped up in the blank, which engages the crate top and base and is closed and fastened.

## NEW 17 MINUTE FILM ON SAFE TRANSIT OFFERED

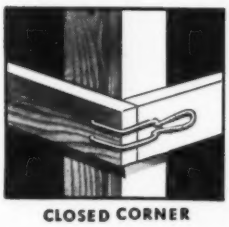
A new 17-minute 16 mm. film, in sound and color, entitled *The National Safe Transit Story,* is now ready for distribution, according to John C. Oliver, Secretary of the National Safe Transit Committe and Managing Director of the Porcelain Enamel Institute, its sponsoring assn. The new film, which explains in full the NST Committee's pre-shipment test procedures for packaged products and basic carloading, was produced under the supervision of P. W. Bush, Westinghouse Electric Corp., and Chairman of the Committee's Technical Division.

The film was developed to disseminate nationwide information on the National Safe Transit Program to carrier and industry groups concerned with the safe transit of packaged products. The film shows in full the NST pre-shipment tests which were developed by the Committee to simulate actual transit conditions. The thousands of miles of experimental test runs and the research data gathered from hundreds of test shipments prior to the final formulation of the NST test procedures are explained. The actual humping of railroad cars is illustrated together with the degrees of shock to which a loaded car might be subjected during the course of normal transit conditions.

The new film also stresses the use of the Safe Transit label which is used by participants in the NST Program to identify their pre-shipment tested products. Carrier groups have cooperated wholeheartedly in familiarizing their personnel with the label, which is playing a vital role in the reduction of in-transit damages. It is felt by the Committee that use of this film, with its emphasis on the label, will further assure careful handling of pre-shipment tested packaged products.

R. F. Bisbee, NST's General Chairman, pointed out that the Committee also has an earlier film entitled, *The National Safe Transit Program,* which covers in considerable detail Projects 1 and 1A — preshipment test procedures for packaged products from 100 lbs. to 1,000 lbs. and for packaged products under 100 lbs. The new film, Mr. Bisbee stated, treats these two projects in summary fashion only and presents in detail Project 1B—procedure for preshipment testing of basic carloading—which, when combined with Projects 1 and 1A, offers an additional means for still greater reductions in transit damage.

Films may be purchased or rented for educational and sales promotional work by Certified Manufacturers and Certified Laboratories. They can also be used effectively by Carriers and Container Groups for educational work.

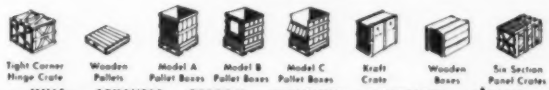

CLOSED CORNER

B-G Designs Wrap-Around Tight-Corner Crates to fit *your* product and to give you an overall lower packing cost. Ideal crate for tall and bulky items—Water Heaters—Hot-Air Furnaces—Refrigerators, etc.

Pre-tested to meet handling and transportation hazards. Protects your product and saves money in your shipping and handling costs.

B-G Containers are delivered flat, in 3 completely assembled sections. Pre-drilled nail holes. Unique Tight-Corner feature. Palletized for fork-lift handling, saves time and storage space.

B-G handling and packaging engineers will gladly call to discuss your specific shipping problems. Please write. You'll profit by our 30 years experience.

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## ADVERTISERS' INDEX


| | PAGE |
|---|---|
| ALBION MALLEABLE IRON | 80 |
| ALUMINUM CO. OF AMERICA | 3 & 4 |
| AMERICAN NICKELOID CO. | 56 |
| ARMCO STEEL CORP. | 1 |
| BIGELOW-GARVEY | ST-11 |
| CENTURY VITREOUS ENAMEL CO. | 60 |
| CHICAGO MILL & LUMBER CO. | ST-9 |
| CHICAGO VITREOUS CORP. | 12 |
| CINCINNATI CLEANING & FINISHING MACHINERY CO. | 53 |
| COORS PORCELAIN CO. | 19 |
| COWLES CHEMICAL CO. | 77 |
| CUYAHOGA SPRING CO. | 83 |
| DU PONT DE NEMOURS CO., INC., E. I. | 35 |
| EFFICIENT TOOL & DIE CO. | 48 |
| ELCO TOOL & SCREW CORP. | 83 |
| FERRO CORP. | 29 & 30 |
| FEDERAL MACHINE & WELDER CO. | 27 |
| FINISH MAGAZINE | 82 |
| FOLLANSBEE STEEL CORP. | 10 & 21 |
| FOSTORIA PRESSED STEEL CORP. | 2 |
| GENERAL BOX CO. | ST-4 |
| GRAND RAPIDS VARNISH CORP. | 7 |
| GREAT LAKES STEEL CORP. | 68 |
| O. HOMMEL CO. | 81 |
| HUYCK CONSTRUCTION CO. | 55 |
| INGRAM-RICHARDSON, INC. | 14 |
| INLAND CONTAINER CORP. | ST-10 |
| INTERCHEMICAL CORP. | 32 & 33 |
| INTERNATIONAL NICKEL CO. | 16 |
| INTERNATIONAL PAPER CO. | ST-6 |
| LUX CLOCK MFG. CO., THE | 47 |
| MACCO PRODUCTS CO. | 66 |
| MAHON CO., THE R. C. | 24 |
| MARSCO MFG. CO. | 13 |
| MILLS PRODUCTS, INC. | 15 |
| MOLDED PRODUCTS DIV., ADMIRAL CORP. | 39 |
| NATIONAL LOCK CO. | 76 |
| NEWCOMB-DETROIT | 83 |
| NORTHWEST CHEMICAL CO. | 75 |
| NU MATIC GRINDERS, INC. | 11 |
| PATTERSON FOUNDRY & MACHINE CO. | 2nd COVER |
| PEERLESS WIRE GOODS CO. | 8 |
| PENNSYLVANIA SALT MFG. CO. | 20 |
| PETERS-DALTON, INC. | 54 |
| PORCELAIN ENAMEL INSTITUTE | 57 |
| PYRAMID MOULDINGS, INC. | 70 |
| RANSBURG ELECTRO-COATING CORP. | 71 |
| REYNOLDS METALS CO. | 58 & 59 |
| SHELL CHEMICAL CORP. | 18 |
| SELCK & CO., WALTER E. | 76 |
| TUTTLE ELECTRIC PRODUCTS, INC. | 4th COVER |
| UNION STEEL PRODUCTS CO. | 3rd COVER |
| VANCE INDUSTRIES | 8 |
| VANANT CO. | ST-8 |
| VERSON ALLSTEEL PRESS CO. | 22 |
| WATKINS CONTAINER MFRS. | ST-3 |
| WEAN EQUIPMENT CORP. | 42 & 43 |
| WHEELING STEEL CORP. | 62 |
| YOUNGSTOWN SHEET & TUBE CO. | 6 |



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**Address reply to Box 956-A c/o *finish* York St. at Park Ave., Elmhurst, Ill.**

## G. E. TO CONSTRUCT APPLIANCE MOTOR PLANT IN MID-SOUTH

Plans to construct a plant of General Electric Co.'s Appliance Motor Dept. at Murfreesboro, Tenn., have been announced by department general manager, Carl W. Moeller, and Harold A. MacKinnon, vice president and general manager of the Component Products Div. The 135,000 sq. ft. facility will be completed late in 1957.

"Sales of automatic washing machines, including the relatively new combination washer-dryer, are expected to increase almost 100% by 1965," according to Moeller. "While the demand for individual clothes dryers should increase over 100% during the same period, sales of electric sink appliances are expected to increase over 200% by 1965."

Selection of the mid-south for the new facility was predicated by the several customer moves to that area, it was reported, and will allow for better customer servicing. Moreover, the southern location provides added insurance of dual sources of steel and other raw material supplies.

## NATIONAL SAFETY COUNCIL CITES PITTSBURGH PLATE

Ten Pittsburgh Plate Glass Co., industrial units and two plants of the Columbia-Southern Chemical Corp., its wholly-owned subsidiary, have been cited for National Safety Council awards for outstanding safety performances during 1955, Thomas R. Donoghue, manager of plant safety and protection, announced.